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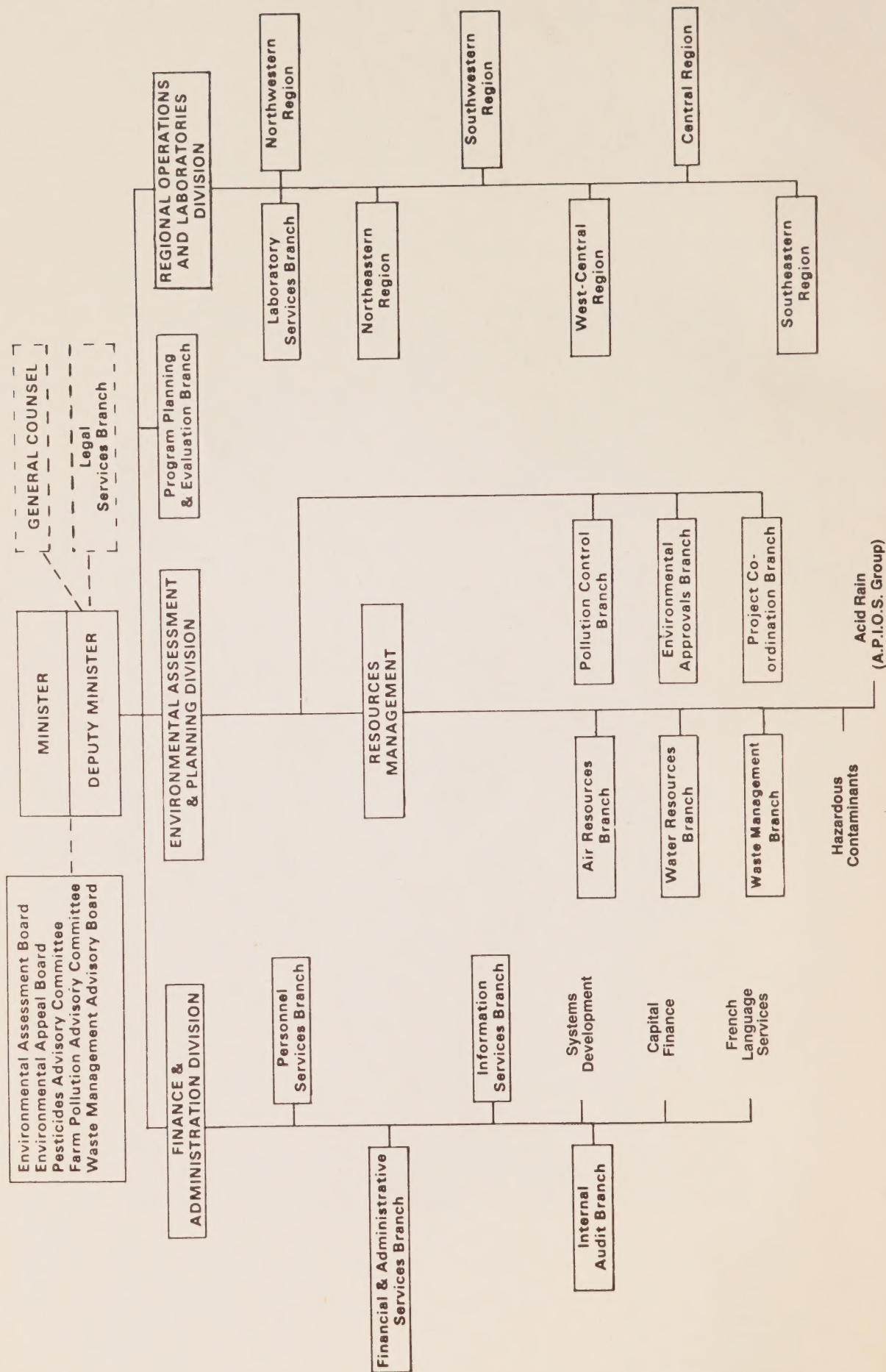
Annual Report 1979~1980

176



Ministry of the Environment

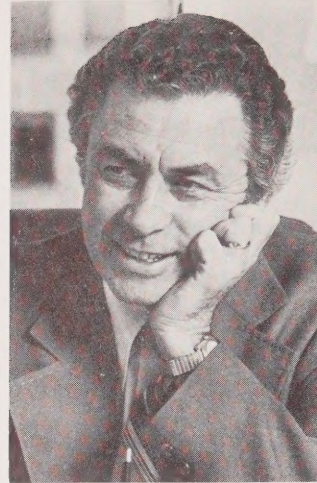
MINISTRY OF THE ENVIRONMENT—AUGUST 1, 1980



contents

DEPOSITORY LIBRARY MATERIAL

Organization Chart	Frontispiece
Letters of Transmittal	2
The Ministry—Past and Present	3
Deputy Minister	5
Program Planning and Evaluation Branch	5
Legal Services Branch	6
Environmental Assessment & Planning Division	7
Air Resources Branch	7
Water Resources Branch	10
Pollution Control Branch	16
Environmental Approvals Branch	19
Project Co-ordination Branch	21
Waste Management Branch	25
Regional Operations and Laboratories Division	29
Northwestern Region	29
Northeastern Region	32
Central Region	33
West-Central Region	35
Southeastern Region	37
Southwestern Region	39
Laboratory Services Branch	42
Finance and Administration Division	47
Financial and Administrative Services Branch	47
Capital Finance	48
Systems Development	48
Internal Audit Branch	49
Information Services Branch	49
Personnel Services Branch	51
French Language Services	52
Boards and Commissions	53
The Waste Management Advisory Board	53
The Environmental Assessment Board	54
The Pesticides Advisory Committee	54
The Environmental Appeal Board	55
The Farm Pollution Advisory Committee	55
The Royal Commission on the Northern Environment	56
Appendices—Charts and Tables	57
Annual Total Expenditure by Project Type 1979-80	57
Annual Total Expenditure by Class, Capital Construction Program 1979-80	57
Number and Value of Contracts Tendered Annually 1979-80	58
Annual Volume of Activity	58
Laboratory Workload by Region/Branch—1979-80	59
MOE Programs—Laboratory Support	60-61
Ontario Air Pollution Index—1970-1980	62



To:
The Honourable
Harry C. Parrott, D.D.S.
Minister.

Sir,
I have the honour to submit
for your approval the
annual report of the Ministry
of the Environment for the
year 1979-80.

Respectfully submitted,

A handwritten signature in dark ink, reading "Graham W.S. Scott".

Graham W.S. Scott, Q.C.
Deputy Minister

To:
His Honour,
The Lieutenant-Governor
of the Province of Ontario.

May it Please Your Honour,
I have the privilege to
present the annual report of
the Ministry of the
Environment for the fiscal
year beginning April 1, 1979,
and ending March 31, 1980.

Respectfully submitted,

A handwritten signature in dark ink, reading "Harry Parrott".

Harry C. Parrott,
Minister

The Ministry—Past and Present

In the brief span of 20 years, the field of environmental protection has grown from the concern of a handful of visionaries to a major responsibility of government agencies around the world.

At the forefront of this tremendous surge of human awareness and the development of modern pollution abatement technology has been the Government of Ontario which established the Ontario Water Resources Commission in 1957, the first agency of its kind in the world.

Ontario was among the first to take further steps in protecting its natural environment by establishing an effective system of air pollution control and other units to deal with environmental issues, such as waste management and controls in the use of pesticides. The formation of the Department of the Environment followed in 1970 and all the Province's environmental agencies were amalgamated into the Ministry of the Environment in 1972.

Goals

This pioneering commitment to environmental protection has led to research, legislation and policies which have made the Province a recognized leader in the environmental field. To provide Ontario's 8.5 million citizens with effective environmental management the Ministry has set four major goals:

1. To ensure proper control over the emission of contaminants into the natural environment for the purpose of achieving and/or maintaining predetermined standards of environmental quality.
2. To ensure that proposed programs, projects, policies and legislation in/or affecting Ontario incorporate the necessary environmental safeguards through direct involvement in the co-ordination and development of a provincial land use plan.
3. To foster the improved management of waste and water to achieve a more efficient use of natural and material resources.
4. Where the above measures are not sufficient, to develop specialized techniques for the restoration and enhancement of environmental quality.

To achieve these goals, the Ministry has established four programs:

1. Ministry Administration Program
2. Environmental Assessment and Planning Program
3. Environmental Control Program
4. Resource Recovery Program

Ontario's Environmental Legislation

The Environmental Protection Act, 1971:

This Act covers all types of pollution, forbidding the discharge of any contaminant to the natural environment in amounts or concentrations exceeding those prescribed by regulation. Contaminant definition includes solids, gas, liquids, odours, sound, vibration, radiation or combination of any of these which result directly or indirectly from activities of man and may cause injury to humans, flora or fauna.

In addition to regulated limits, the Act prohibits any discharge that is likely to impair the natural environment, injure or damage plant or animal life, cause harm or discomfort to any person, affect the health or safety of any person or render any property, plant or animal life unfit for use by man.

The Ontario Water Resources Act:

This Act gives the Ministry of the Environment extensive powers to regulate the water supply, sewage disposal and the control of water pollution. It authorizes the Ministry to supervise and examine all surface waters and ground waters in Ontario, to determine the extent, nature and causes of contamination in these waters.

The Ministry can construct and operate water waste treatment facilities, or it can require an industry or municipality to construct and operate approved facilities.

The Environmental Assessment Act, 1975:

This Act provides for the assessment of any proposed major undertaking, governmental, municipal or private, at the very earliest stage to permit alteration or even cancellation of the undertaking should it be environmentally unacceptable. It also provides for full public participation in the decision-making process. It is being implemented in stages, applying first to major provincial and certain municipal undertakings. Preliminary discussions are now underway on extending the Act to the private sector.

The Pesticides Act, 1973:

This legislation restricts the storage, distribution, sale and use of pesticides. The Ministry examines and licences professional exterminators and maintains a classification system to ensure that hazardous chemical pesticides are not handled or used by unqualified persons.

Report 1979-80

During 1979-80, the Ministry advanced on many fronts. The activities and achievements of Ministry programs and initiatives are reported by Divisions, Operating Branches and Regions in the following pages.

deputy minister

Deputy Minister—G.W.S. Scott, Q.C.
Executive Assistant—R.G. Clark

Program Planning and Evaluation Branch

Director: A. Castel

The Program Planning and Evaluation Branch is concerned with the effective management and efficient use of Ministry resources, both short—and long-term. The Branch co-ordinates and analyzes Ministry policies and programs; provides liaison with the government's central agencies; and co-ordinates policy submissions. During 1979-80, a Ministry policy approval process was developed involving the preparation and maintenance of a Ministry Policy Manual.

The Branch develops and maintains Ministry long-range and operational planning systems. At year-end, the Ministry's goal statement was being examined and a strategic planning process developed. The Branch co-ordinates the resource allocation process through which the annual budget of the Ministry is determined. It also administers in-year reallocations of manpower and finances on the basis of priority, develops the annual work program and maintains the management-by-results system. The Branch increased its participation in planning and socio-economic studies on major environmental issues.

The following major studies and projects were completed or being prepared in 1979-80:

- (1) new product opportunities in Ontario in the pollution control equipment field;
- (2) development of the Ministry's capital construction program;
- (3) an index of statistical files and computer systems;
- (4) summaries of findings and conclusions of three Ontario government reports on the pulp and paper industry;
- (5) financial assistance available to Ontario companies for pollution abatement expenditures;
- (6) the economic effects of pollution abatement on the pulp and paper industry: results of an econometric study;
- (7) a critique of policies and regulations for carbonated soft drink containers.
- (8) developed a background paper on proposed socio-economic studies to be undertaken by the Ministry as part of its acidic precipitation program.

Legal Services Branch

Director: J.N. Mulvaney, Q.C.

Staff of Legal Services Branch are employed by the Ministry of the Attorney General and provide legal services on a solicitor and client basis to the Ministry of the Environment.

A major function of the Branch is the conduct of prosecutions under environmental legislation. The Branch screens cases being considered for prosecution, advises on the best methods of gathering and presenting evidence, and provides counsel to present these cases in court. In addition, it acts as counsel for any Director whose decision under a statute is being reviewed in a hearing before the Environmental Appeal Board or other review tribunal.

On two occasions during 1979-80, injunction proceedings were taken to bring about compliance with Ministry Orders or with the legislation.

During the year, Legal staff handled 105 cases before the courts under The Environmental Protection Act, The Ontario Water Resources Act and The Pesticides Act. Of these, 46 cases resulted in convictions; 11 cases resulted in dismissals (three of which were under appeal at year-end); two cases were withdrawn. The remaining cases were still before the courts at year-end. Staff also handled a number of minor offences under the boating regulation and vehicle prosecutions.

Other legal services included: acting as counsel in arbitration hearings under construction contracts; advising on the appropriate application of the Ministry's powers; advising on the form of documents and orders that can be issued by Directors under the legislation; providing legal advice to the operating Branches; preparing Orders-in-Council, regulations, contracts and Orders.

environmental assessment and planning division

Assistant Deputy Minister: J.W. Giles

Executive Director: W.B. Drowley

This Division has three major responsibilities which provide a scientific base for many of the Ministry's policies and activities:

To serve as the central approval and co-ordinating agency for applications involving the design, construction and operation of water, sewage, solid waste reclamation and recycling plants and waste disposal sites required under Ontario legislation.

To conduct scientific and technical research, assessment and pollution control programs involving the use of water, land and air resources, the environmental implications of realty development and the control of all forms of pollutants.

And, to provide technical and supervisory services required in the planning, construction and operation of water and sewage treatment plants, solid waste and resource recovery facilities.

Air Resources Branch

*Director: T.W. Cross

The Air Resources Branch supplies base information for the development of air quality management strategies and Ministry policies directed at achieving and maintaining desirable air quality in Ontario. The information consists of comprehensive air contaminant measurements, detailed knowledge of new technology and recommendations concerning air quality criteria and standards.

Air Quality and Meteorology

The Air Quality and Meteorology Section maintains the data base and telemetry system of Ontario's air monitoring network, which included approximately 1,400 instruments in 100 areas in 1979-80. This network produced approximately three million data points that were computer processed, validated and interpreted in published reports. The following pollutants were routinely monitored: sulphur dioxide, nitrogen oxides, carbon monoxide, ozone, hydrocarbons, total reduced sulphur, dustfall and total suspended particulate matter, including its components (sulphate, nitrate, lead and other trace metals). Sulphation and fluoridation rates and the soiling index were also routinely measured.

All continuous air pollution monitors undergo rigorous audition and calibration checks on a regular basis by the Sections Calibration Unit to insure the validity of measured data. During 1979-80, the Ontario Ministry of the Environment became the first Canadian environmental monitoring agency to adopt ultraviolet photometry as its ozone standard. This action was undertaken to ensure compatibility with ozone monitoring being conducted in U.S. States along Ontario's border according to methods required by the U.S. National Bureau of Standards.

The Ontario Air Pollution Index, the basis for Ontario's Alert System, was expanded into St. Catharines during 1979 and continued to be monitored and publicized daily for Windsor, Sarnia, Hamilton, Niagara

*T.W. Cross was appointed director of the Environmental Approvals Branch in September 1980.

Falls, Toronto, Sudbury, Coniston and New Sudbury. Air pollution index readings from 1970 to 1980 can be found in appendices.

A study of airborne particulate nitrate and its relationship to large-scale weather systems indicated high concentrations were associated with southwesterly airflows that advected nitrates from long distances into Ontario.

An operational air trajectory model was utilized in the analysis of historical data to determine the relationship between the chemical components of precipitation and long-range transport of air pollutants. Continued study of the acidity of precipitation in regions of Central Ontario and its relationship to distant pollutant sources has further confirmed the importance of sources at distances greater than 1,000 km.

A model to predict short-term pollution concentrations from elevated sources under convective atmospheric conditions has been developed and validated with data collected during field studies in the Sudbury area.

A long-term, long-range statistical model has been used to estimate sulphur dioxide and sulphate concentrations over a grid covering the north-eastern United States and Canada.

A study of the trend of airborne particulate lead indicated that a 59 per cent decrease in lead concentrations during the period 1972-78 correlated well with a reduction in the lead content of gasoline during those years.

During 1979-80, the staff of the Air Quality and Meteorology Section published nine papers in scientific journals and presented five papers to technical conferences.

Criteria Development and Program Planning

The Criteria Development and Program Planning Section established guidelines for 12 new air contaminants in the Province and prepared detailed reports on 30 environmental assessments. Section members also worked on three federally organized task forces to produce federal regulations and guidelines for various industries.

The Section, Southwestern Region and related industry, finalized a new regulation for SO₂ emissions in the Sarnia area. The regulation also provided for a comprehensive ambient air sampling network as part of the control mechanism.

The Section and the Land Use Co-ordination Section of the Environmental Approvals Branch developed the rationale and suggested dimensions for the "Industrial Influence Area" recommended in the Haldimand-Norfolk Regional Plan.

The Section undertook a cost-benefit study of clerical support systems for the Branch that resulted in acceptable revisions for more efficient, less costly service.

Phytotoxicology

The Phytotoxicology Section conducted soil and vegetation assessment studies near 129 industrial and other sources in Southern Ontario in 1979-80. Investigation reports were provided to regional managers for use in environmental management programs. The Section also investigated 230 vegetation complaints from the public of which 45 per cent were confirmed as being caused by pollutants. Investigation reports were provided to the complainants, the alleged offending sources, regional managers and the Board of Negotiation.

The Section investigated the effects of fluorides emitted by industries manufacturing hydrofluoric acid, fertilizers, steel, aluminum, uranium hexafluoride, brick, ceramic, frit and glass. The Section also investigated the effects of sulphur dioxide, lead, boron, ethylene, nickel, cobalt and mercury emitted by various industries in Southern Ontario. In the City of Toronto, soil that had been replaced on residential properties adjoining several industries was retested for lead content.

Biological monitors consisting of fluoride sensitive gladiolus plants were established in the vicinity of eight industries to monitor atmospheric fluorides. Indicator plots consisting of plants selected to differentiate between effects caused by photochemical oxidants, sulphur dioxide and ethylene were established. Networks of sphagnum moss bags were established in the vicinity of several industries to determine the degree and extent of heavy metal deposition.

During the 1979 crop-growing season, the Section conducted extensive field assessment surveys to determine the degree of photochemical oxidant (ozone and/or peroxyacetyl nitrate) injury on white bean, tomato and potato crops. Oxidant injury to crops was less severe in 1979 than in 1978.

At Nanticoke, the Section continued studies where major operations by Ontario Hydro, Stelco and Texaco are planned. No fluoride or sulphur dioxide injury has been observed on vegetation in the study area to date, but ozone injury has occurred annually on established indicator plants.

The Section collected 9,762 vegetation and soil samples for laboratory examination (chemical analysis, herbarium, pathology and histology). Phytotoxicology guidelines for excessive levels of contaminants in soil and vegetation have been developed for excessive levels of contaminants in soil and vegetation have been developed for 19 contaminants. The Section conducted a number of research studies both in the field and in controlled environment greenhouse and growth chamber facilities. Some studies involved differential diagnosis of contaminants and crop injury protection.

A phytotoxicology display on the effects of various contaminants on vegetation was shown at the International Plowing Match at Chatham in September 1980.

During 1979-80, three phytotoxicology papers were published in scientific journals; seven papers were presented to technical conferences; 21 extra-ministerial activities were undertaken by phytotoxicology staff in conjunction with provincial, national and international committees and task forces.

Technology Development and Appraisal

The five units of the Technology Development and Appraisal Section conducted a wide range of investigations in support of Air Management Branch activities in 1979-80.

The **New Technology Unit** kept the Branch informed of technological developments in control methods and industrial processes. The relationship of current and developing technologies to contaminant emissions and the control of these emissions were reviewed and assessed for the benefit of the Ministry as a whole.

The Unit monitored developments in methods for reducing sulphur dioxide and oxides of nitrogen emitted by utilities, metallurgical industries and industrial combustion sources, particularly with regard to the problem of acidic precipitation. Not only were methods of removal from the exhaust flue gases studied, but methods of avoiding their production, such as coal desulphurization and gasification, were also examined. The knowledge gained in the process aided examination of specific regional problems, especially of odours and particulate emissions.

The Unit spent considerable time studying and developing methods of destroying PCBs, including the burning of PCBs in a cement kiln at St. Lawrence Cement in Mississauga.

The Unit is responsible for establishing inventories of potentially hazardous contaminants. During the year, Acres Consulting Ltd. completed a survey of specified chlorinated and aromatic hydrocarbons under a contract let the previous year. A data handling system for this information was developed and data entry was initiated. At year-end, the system was being extended.

The **Monitoring and Instrumentation Development Unit** conducted intensive ambient air monitoring surveys in Nanticoke, Mississauga, Sudbury, Sarnia, Cornwall, Guelph-Kitchener and Port Hope.

Following the derailment of railway tank cars in Mississauga, the Unit operated an extensive monitoring program for chlorine in the affected area with the contracted assistance of Sciex Inc. Sciex Inc. also helped the Unit operate the TAGA 3000 mobile laboratory in the development of methods for monitoring PCBs in ambient air and stack gas.

The Unit organized and participated in a Province-wide PCB survey in ambient air. A substantial portion of the work was performed by contractors (Nucrotechnics, Moniteq and IEC) and the Laboratory Services Branch.

The high resolution gas chromatograph was brought on-line during the year, with its performance-testing conducted on synthetic PCB samples. It was used with a capillary column to analyze more than 700 air samples collected in the Province-wide PCB survey.

The Unit worked towards increasing the Branch's monitoring capabilities. At year-end, it was working on methods of detecting different organic contaminants at parts per billion (ppb) and sub-ppb levels, the preparation and long-term stability of standards and different presentation techniques.

The **Special Studies Unit** is responsible for the co-ordination of activities under the Nanticoke Environmental Management Program (NEMP), the Sudbury Environmental Study (SES) and the Atmospheric Research Program in the Acidic Precipitation in Ontario Study (APIOS).

Routine particulate, gaseous pollutant and precipitation monitoring continued in the Nanticoke area. The data from the NEMP network, together with results of measurements made by other groups (Ontario Hydro, the West-Central Region) was deposited in the NEMP data base and reported monthly. By year-end, a year's data had been accumulated and a first-draft report prepared and distributed for comment.

Mathematical modelling progressed with the validation of the summertime fumigation air quality model, based on data from past intensive studies in the Nanticoke area. A study was carried out in May and June of 1979 to measure: 1) sulphur dioxide concentrations at ground level and aloft during fumigations of the Hydro generating station plume, as well as plume sulphur dioxide oxidation rates, and 2) ambient concentrations of individual hydrocarbons in the vicinity of the Texaco refinery. Several papers related to the Nanticoke mathematical model were published in scientific journals and presented at conferences. A real-time data acquisition and processing system was installed; air quality reports from Nanticoke were being transmitted to the Air Resources Branch in Toronto at year-end.

Field monitoring activities continued in the Sudbury Environmental Study and several projects (e.g., the meteorological measurements program, the study of sulphur dioxide oxidation in the Inco plume under various meteorological conditions) were completed and their results presented in reports and scientific publications. Three intensive studies were carried out: emphasis was upon 1) emission rates and chemical and physical characterization of particulates in the Inco and Falconbridge stack plumes, and 2) dispersion and fumigation of the Inco 381-metre chimney plume under Summer convective conditions.

Mathematical modelling of smelter effects on air quality in the Sudbury basin was nearing completion at year-end. During the year, overall emphasis in the SES Atmospheric Research Program was upon data analysis, especially concerning the effect of smelters on precipitation chemistry and deposition and several important advances were made in this area.

Most of the effort in the Acidic Precipitation in Ontario Study has been concentrated on setting up the Atmospheric Deposition Monitoring Program. This work included finalization of the wet/dry monthly and event deposition monitoring network design, site selection and inspection, development of sample collection and handling procedures. Discussions were held with other agencies regarding co-operation in the areas of sampling and data exchange. An intercomparison study of the precipitation sampling and analysis methods used by the Ministry, the Atmospheric Environment Service and the Canada Centre for Inland Waters was undertaken. A plume washout study was also

initiated at the two largest point sources of sulphur emissions in Ontario: the Inco smelter at Sudbury and the Hydro generating station at Nanticoke. The study is to assess the impact of these sources on precipitation quality by direct under-plume measurements of rain during specific events.

The **Hazardous Contaminants and Research Planning Unit** is responsible for co-ordination of activities under the Branch's hazardous contaminants, research grants and emergency response programs. During 1979-80, background reports on polycyclic aromatic hydrocarbons, aromatic amines and azo dyes were completed. A major program to characterize the physical and chemical properties of the inhalable portion of airborne particulate matter was initiated. Programs to co-ordinate development work by the Regions, the Air Resources Branch and the Laboratory Services Branch on: 1) organic vapors sampling and analysis, and 2) a sampling kit for non-routine situations was continued from 1978-79.

The Research Grants Program sponsored 21 projects amounting to \$280,000 at 11 universities. The Unit managed five additional major research projects under Provincial Lottery Trust Fund sponsorship.

The **Source Assessment Unit** is responsible for the co-ordination of source testing in support of various abatement and emission survey programs, the specification and writing of source testing methods, the initiation of research on measurement techniques and the design and the conduct of emission testing. Of special interest in 1979-80 were programs to evaluate the effectiveness of novel technologies for abatement of coke oven emissions, including polyaromatic hydrocarbons; measurements of background PCB levels in emissions from a cement kiln; and the evaluation of associated novel sampling techniques.

The Unit overviewed source sampling programs in support of various abatement programs in 40 industrial plants and evaluated 27 source testing reports. The Unit was responsible for the design, erection and maintenance of the sampling line for the TAGA 3000 mobile laboratory. The Unit also designed and performed source testing for the Sudbury Environmental Study, the Nanticoke Environmental Management Program and the Automotive Paint Baking Program.

Vehicle Emissions

During 1979-80, the Vehicle Emissions Section stopped 6,627 cars in 20 locations throughout Ontario in spot checks for emission controls and exhaust pollutant levels. Of all cars tested, 49 per cent failed to meet Ontario emission guidelines, while 272 cars were found with pollution control equipment missing, disconnected or inoperative. Twenty-six charges were laid against vehicle owners. Owners in 11 cases were found guilty and fined; two cases were dismissed; 13 cases were still pending at year-end. In August, the voluntary guidelines became mandatory standards following the introduction of O. Reg. 561/79. Extensive publicity brought the standards to the notice of the automotive trade and the public, and the section began enforcing the new provisions.

Section inspectors visited 439 used-car dealerships and inspected 1,828 cars under Section 23 of The Environmental Protection Act. As a result, 99 Violation Notices were issued, all of which were satisfactorily cleared before the vehicles were sold.

Highway patrols in co-operation with OPP personnel resulted in 530 vehicles being stopped for excessive smoke emissions. Subsequently, 108 warnings and 422 charges were issued by the OPP under the provisions of Section 49 of The Highway Traffic Act. Vehicle owners in 350 cases were found guilty and fined; eight cases were dismissed; 64 cases were pending at year-end.

Section personnel made 26 visits to nine community colleges to explain provisions of The Environmental Protection Act and the Ministry's control programs to student mechanics. Presentations were made to 71 classes comprising 2,105 apprentices.

In a joint evaluation program undertaken with the Research and Development Division of the Ministry of Transportation and Communications, the Section carried out 156 tests on 36 vehicles while studying the relationship between engine performance, engine maintenance, fuel economy and pollution control.

Water Resources Branch

Director: D.N. Jeffs

The Water Resources Branch provides a number of services and programs, including water resources planning and co-ordination and the development of policies and guidelines relating to water resources protection and management. The Branch co-ordinates and gives policy direction for inventory programs and data processing and analyzes and publishes monitoring and inventory data. It provides specialized technical advice to Regional staff and technical training and method development in support of Ministry programs. It also provides Inter-agency liaison and technical representation on International Joint Commission (IJC), Inter-Ministerial and other committees.

Great Lakes

The Branch provided total phosphorus loadings for all significant tributaries to the Great Lakes from the Canadian portion of the drainage basin for the 1978-79 water year. These data were used in reporting on the state of the Great Lakes in the International Joint Commission's 1979 Water Quality Board Report.

The Branch continued to participate in the work of the IJC's International Great Lakes Diversions and Consumptive Uses Study Board. Information prepared by the Branch on withdrawals and consumptive water uses in Ontario are to be incorporated in the Study Board's final report to the IJC in 1981.

The Branch continued to participate in dealings with Ontario Hydro on issues related to: 1) entrainment of larval fish and impingement of fish at cooling water intakes, and 2) aquatic biota habitat impacts of waste heat discharges at the major nuclear and thermal electric generating facilities located on the Ontario shorelines of the Great Lakes.

During 1979-80, the Ministry reached agreement with Ontario Hydro on a cooling water discharge outlet design at the Darlington "A" Generating Station that will afford environmental protection for the adjacent fish habitat. Agreements were also made with Ontario Hydro to investigate methods to minimize entrapment or impingement of fish at cooling water intakes at the Nanticoke and Bruce Generating Stations.

Young-of-the-year minnows (spottail shiners) have been collected from various sites along the Great Lakes shoreline over the last five years and used as monitors of pesticides, PCBs and Mirex levels. These fish provide an indication of local contaminants input due to their limited exposure period and range. Declines in PCB levels were most pronounced in 1979-80; the same trend was observed for DDT, although to a lesser extent. These changes reflect the general restriction placed on those compounds. Mirex concentrations also declined to the point where they were at trace or nondetectable levels in spottail shiners.

The following are highlights of the Ministry Great Lakes Surveillance program:

Lake Superior: Total phosphorus, dissolved oxygen and phenol levels associated with Thunder Bay inner harbour and the river mouths showed some improvement from 1977-78 levels. Non-compliance of dissolved oxygen in 1979-80 was restricted primarily to the river mouths while phenol levels in excess of 1 ug/L were restricted only to a distance of 2 km offshore.

St. Mary's River: Cyanide and ammonia levels in the St. Mary's River during 1979-80 were in compliance with the Agreement and provincial objectives. Phenol levels show no significant changes from those in 1978-79 and remained above the Agreement objectives despite the installation by Algoma Steel Corporation of new coke oven by-product recovery facilities aimed at reducing the phenolic loads. The Company is currently investigating the remaining source(s) of high phenol loading. Phase I of Great Lakes Power construction was completed. Data collected by the proponent indicated no impairment of river water quality during this stage. A monitoring program was proposed by the proponent for Phase II construction and was approved by the Ministry.

Lake Huron: Continued monitoring of total phosphorus levels in Penetang Harbour showed that levels in 1979-80 decreased by about 20 per cent. A reduction in total phosphorus loading from sewage treatment plants contributed to this improvement.

The Ministry recommended that total phosphorus levels in the sewage treatment facility for Midland be reduced to 1 mg/L. Monitoring of Midland Harbour Bay will continue to assess the effectiveness of this remedial measure.

Under the International Great Lakes Surveillance

plan, Lake Huron is designated for intensive monitoring during 1980-81. This plan will update prior environmental baseline data for the Canadian coastal zone of Lake Huron, Georgian Bay and the North Channel.

St. Clair River: The St. Clair River organic study was completed and three of six reports were published. Findings of these reports indicated that significant improvements in the river environment have taken place during the last decade. Remedial measures undertaken at municipal and industrial source discharges were major contributors to the observed improvements.

Lake Erie: A two-year international study of Lake Erie water quality was completed in 1979-80. A final report to be presented to the IJC in 1981 will outline the lake's response to remedial measures implemented since the signing of the Canada-US Water Quality Agreement in 1972. Results have shown significant improvement in the biological communities of the western basin since 1968. Total phosphorus levels in the basin remained below the high levels of early 1970s. Total phosphorus concentrations in the eastern basin have remained relatively constant since the initiation of phosphorus controls in 1970.

Since 1969, water quality conditions and currents in the nearshore area of Lake Erie at Nanticoke have been under surveillance to provide a baseline for determining the effects of future industrialization. Various studies carried out under the Nanticoke Environmental Committee comprising representatives of the Ministry, the Ministry of Natural Resources, Stelco, Texaco and Ontario Hydro, were summarized in a series of technical reports. All water quality parameters measured met Provincial Water Quality Objectives.

Niagara River: A trace contaminants survey of the Niagara River conducted in late 1979 revealed the presence of heavy metals, pesticides, PCBs and mirex in the river's ecosystem. Water samples were in compliance with drinking water criteria, but at some locations, objectives for the protection of aquatic life were exceeded for PCBs, DDT, BHC, dieldrin, heptachlor epoxide, endrin, thiodan and/or cadmium. Sediment samples at certain sites contained high concentrations of PCBs, arsenic, chromium, copper, lead, mercury, nickel and/or zinc (above MOE dredge spoil disposal criteria). Analyses of suspended sediments indicated that the Niagara River is a continuing source of a number of organics and metals to Lake Ontario.

Lake Ontario: Highly significant downward trends in total phosphorus levels have been documented in Lake Ontario nearshore for the 1967-79 period. The rate of decrease has varied from 3.1 ug/L/yr in the Oakville to Toronto area to 2.3 ug/L/yr in the Toronto to Ajax area, 2.0 ug/L/yr in the Niagara to Jordan Harbour area and 1.3 ug/L/yr in the Jordan Harbour to Oakville area. It is significant that the greatest improvement was recorded along the highly developed sector west of Toronto where phosphorus inputs were highest and where, proportionally, the greatest degree of phosphorus reduction has occurred. Further monitoring is necessary to confirm whether the present control programs will lead to continuing further improvements in water quality.

In Toronto Harbour, bacteriological levels are continuing to decline, likely in response to remedial measures involving sewer separation and trunk sewer installation. For instance, total coliform levels in the Toronto Harbour decreased by 40 per cent from 1978.

A new problem area identified in 1977 near Clarkson and associated with Gulf Oil discharges showed considerable improvement. A comparison of 1977 with 1979 phenolic loading data revealed a substantial decrease in the size of the non-compliance zone, which is directly attributable to significant reductions of phenolic loads discharged by the plant.

Current metre measurements were continued in Toronto Harbour to better define the exchange mechanisms; measurements in the Eastern and Western Gaps have indicated that the flow is layered during the Summer months. Preliminary tests were carried out with a two-dimensional model to show the extent of effects of stormwater inputs to the Harbour from the city waterfront sewers.

Artificial re-aeration of Hamilton Harbour was discontinued, and subsequent observations indicated no significant differences in the oxygen concentrations. Measurements show that substantial quantities of oxygen are being introduced into the deep waters of the Harbour through the Burlington Ship Canal, but increases in the oxygen concentrations occur only temporarily. Investigations of the compounds and processes affecting the oxygen levels suggest that the main sinks for oxygen are the oxidation by bacteria of organic carbon, reduced sulphur and nitrogen compounds. Development of statistical and block water quality models, linking the loadings to the Harbour with oxygen depletion, was commenced.

A study of the behavior of the thermal plume from the Pickering Nuclear Generating Plant during the winter months was planned and implemented in co-operation with Ontario Hydro and the National Water Research Institute. The aim of the study is to define the main direction of the plume, to show whether it follows the shore or disperses into the lake, and to define the effects of the plume on the movement of pollutants from the nearshore region into Lake Ontario.

St. Lawrence River: Bio-accumulation of persistent toxic substances was investigated by the Ministry in the Cornwall-Massena area of the St. Lawrence River. Samples were also taken in areas of discharges to document the relative magnitude of input sources. Acting upon the Ministry's recommendations, New York State has undertaken studies to ascertain specific U.S. sources and initiate remedial measures related to elevated levels of PCBs found by the Ministry at the mouth of the Grass River and in the vicinity of the General Motors and Reynolds Metals outfalls along the U.S. shore. Further Ministry studies are planned to investigate levels of PCBs and phenols in the Domtar effluent in Cornwall.

Pollution from Land Use Activities Reference Group

Branch input to the Pollution from Land Use Activities Reference Group (PLUARG) study was completed with the submission of technical reports to the International Joint Commission on data summaries of streamflow and water quality, data methodology and the effect of some waste disposal practices on Great Lakes water quality.

Inland Lakes

1979-80 was the final year in which the Branch carried out intensive field investigations in seven lakes in the Sudbury area. The acidic control lake, Clearwater Lake, was monitored for the seventh consecutive year. This represents the world's longest continuous monitoring program of an acidic lake. Two of the lakes limed in 1973 to 1975 still had pH levels greater than 6.0. Changes in the biota were still occurring in these lakes, indicating that unassisted recovery rates may be very slow. The pH of Lohi Lake has fallen from 6.5 to under 5.0 since 1975 lime additions, while metal levels have increased. Phytoplankton and zooplankton changes are lagging behind chemical changes in this lake.

Results of experimental low and high level fertilizer additions indicate that acidic lakes can develop symptoms of eutrophication if nutrients are available. Hydrologic and chemical budgets were being constructed for five lakes and are to be used to model rates of metal and acid movement through the lakes, and provide information required to predict the duration of treatments and rates of acidification of lakes or rates of recovery if acid inputs are reduced.

Acidic precipitation continued as a major program in 1979-80, after the first Ministry reports of the problem in 1977. Studies on the deposition of heavy metals such as copper, nickel and lead associated with acid rain were also undertaken. Detailed limnological studies on some 20 lakes centred in Muskoka-Haliburton were continued on a year-round basis. In addition, the tabulation of data from surveys of hundreds of lakes across Ontario was begun. This information is expected to aid in the identification of areas sensitive to acid precipitation.

Thirty acid-sensitive lakes were surveyed in 1979-80 to establish macrophyte and moss species composition and abundance and the metal content of the vegetation. Information from Scandinavia suggests regression of classic soft water plant communities with concurrent invasions of sphagnum mosses and fungi in acidified lakes. Although sphagnum infestations of Ontario lakes have not reached Scandinavian proportions, these mosses were found in 58 per cent of the lakes surveyed, an indication they are common in acidified lakes.

The Branch collected yearling yellow perch from 14 lakes in the Muskoka and Haliburton area affected by acidification to varying degrees. Mercury accumulations in fish increased with greater acidity, but body burdens of mercury were also directly related to the watershed area. A contract study through the Ontario Research Foundation supported this observation by indicating significant atmospheric inputs of the dry vapor phase of mercury in the study area.

Analysis of the same fish for PCBs indicated increased levels in fish for lakes where adjacent roads were oiled for dust control. Further investigations confirmed that even low-level PCB contamination of road oil was leached into nearby lakes and accumulated in fish. The allowable level of PCBs in road oil is being reviewed.

A project to establish the potential of wetlands for year-round sewage treatment in Ontario was continued in 1979-80. Instrumentation of a small natural marsh plot adjacent to the Brantford Sewage Treatment Plant was completed, and collection of background data was initiated in the Spring of 1979. A contract was awarded for the construction of a multi-celled artificial marsh system adjacent to the Town of Listowel's existing sewage lagoons. Construction of this facility was started in October 1979.

The Lakeshore Capacity Study is a multi-ministry co-operative project to develop predictive models concerning the effects of human development on lakes and their watersheds, particularly the capacity to accept recreational development. Compilation of results continued in 1979-80 and preliminary analyses showed that some fraction of the nutrients from human activities on the lakeshore entered the lakes and affected water quality.

The phosphorus removal programs at Gravenhurst and in the Penetang-Midland area produced slightly improved water quality conditions, while in the Bay of Quinte total phosphorus levels were similar to those measured in 1978-79. The destratification projects on Heart and Thompson Lakes were monitored routinely, and a new hypolimnetic aeration study was initiated on Eaton Lake. The two man-made lakes in the City of Mississauga, Aquitaine and Wabukayne, were also monitored. Based on information collected from Lake Aquitaine, modifications are being completed on the Lake Wabukayne siltation basin to improve water clarity conditions.

Analyses of yearling yellow perch collected from the Wabigoon-English River System indicated that mercury contamination appears to be restricted between Dryden and Ball Lake. Data also suggested that mercury levels may be declining in yearling perch. Monitoring will continue in order to more clearly establish trends.

Water Management

The Water Resources Branch developed and co-ordinated a project to facilitate implementation of the document "Water Management: Goals, Policies, Objectives and Implementation Procedures of the Ministry of the Environment". This effort included preparing policy interpretations to assist Ministry staff in applying the revised policies, holding a series of seminars with regional and head-office staff and co-ordinating and participating in the work of a steering committee and five working groups charged with developing detailed implementation procedures.

Branch staff participated in the five working groups of the Water Management Implementation Steering Committee. The operation of the Permit to Take Water

(PTTW) Program was included in the mandate of Working Group IV. Possible legislative changes to Section 37 of The Ontario Water Resources (OWR) Act were documented for review along with finalized procedures to deal with possible land subsidence as a result of permitted takings of water. At year-end, the Branch was assisting in the clarification and definition of Ministry groundwater quality management policy and in the preparation of a manual to direct Ministry responses to regulated and unregulated sources of groundwater contamination.

Regulation of the well-drilling industry continued with the issuing of 491 drilling and boring contractor's licences (34 to contractors being licenced for the first time). Three contractors were prosecuted and two were convicted for infractions under Section 40 of The Ontario Water Resources Act. More than 12,000 water-well records were received for processing by the Branch from water-well contractors in the Province. Two training seminars were sponsored in Kitchener and Sudbury for water-well drilling contractors and their employees.

Proposed amendments to Section 39 and 40 of The Ontario Water Resources Act were finalized. The amendments will allow for upgrading of the well construction industry.

The Ministry distributes information widely on trace contaminants such as mercury, PCB, Mirex and DDT found in sport fish. During 1979-80, the Ministry issued six Environmental Health Bulletins containing new or updated information on contaminants in fish from 317 waterbodies throughout the Province. In April 1979, the second annual edition of "Guide to Eating Ontario Sport Fish" was published for Northern Ontario, Southern Ontario and the Great Lakes. The booklets contain information on 43,000 fish taken from 625 waterbodies. Approximately 200,000 copies were distributed free of charge.

The Fish Contaminant Information Program is a co-operative undertaking of the Ministries of Natural Resources and Environment. The Ministry of Natural Resources collects the fish. The Laboratory Services Branch of the Ministry of the Environment carries out the chemical testing and statistical data analysis. The Water Resources Branch co-ordinates the entire program and prepares the information for the Environmental Health Bulletins and the annual "Guide" books. Medical advice for consumption guidelines is provided by the Ministry of Labour.

The Proposed Model Policies for Urban Drainage Management, previously developed under the Canada-Ontario Agreement on the Great Lakes Water Quality, were distributed for review to other ministries and government agencies, representative organizations for municipal engineers and engineering consulting firms. A final set of the proposed policies was being prepared for publication under the Canada-Ontario Agreement at year-end. The program for the Rideau River Stormwater Management Study, commenced in 1978-79, was continued and the final study proposal was presented for Provincial Lottery funding. Phase I of the program was initiated and assigned to a consultant to evaluate the existing problems and provide recommen-

dations for feasible stormwater management practices.

Activities related to the Grand River Basin Water Management Study were continued with the completion of the bulk of the field investigations. The study has been carried out under the direction of the Grand River Implementation Committee, consisting of representatives from seven ministries (Agriculture and Food, Environment, Housing, Industry and Tourism, Intergovernmental Affairs, Natural Resources, Treasury and Economics) and the Grand River Conservation Authority.

Information was assembled on water quality, aquatic plants and algae, hydrology and user practices for extensive areas of the basin. At year-end the information was being used to evaluate water resource conditions and to predict the effects of development and various water management options through the use of hydrologic, biological, water quality and economic systems models. The Branch and participating groups in the Ministry of Natural Resources and the Grand River Conservation Authority were applying the models to evaluate water management plans to meet needs for flood damage reduction, water quality and water supply in the Grand River basin. The biological model being developed by Branch staff will predict changes in oxygen levels in the rivers caused by the growth of aquatic plants and algae.

The Branch continued collecting continuous data on dissolved oxygen and temperature at eight sites in the Grand River basin. The data are used primarily to verify a continuous simulation, water-quality model.

Staff contributed actively to a public consultation program to inform municipal representatives and officials and the public about water management conditions and practices in the basin. Significant public input to the study was received through the activities of four public consultation working groups representing different parts of the basin.

The inventory of groundwater resources in the Grand River basin was concluded by the Branch. The final report addresses general aspects of hydrogeology and future development of groundwater throughout the basin and provides in-depth analysis of groundwater potentials for water supply for 23 communities, including the Regional Municipality of Waterloo.

In co-operation with the conservation Authority, development of a continuous streamflow data base was completed for the basin. Rainfall patterns were examined and flow frequency analyses were conducted for the evaluation of reservoir operations and prediction of storm runoff.

The linear programming economic screening model was finalized and applied to the Grand River basin. This model will be used for the evaluation of various water quality, water supply and flood control measures, and for the evaluation of recommended water management plans.

Aspects of waste disposal continued to involve the Branch. At the request of the Regional offices, the Waste Management Branch and the Environmental Approvals Branch, hydrogeologic input was provided towards the Ministry's position on a significant number of proposed, active and closed disposal sites. In the area of radioactive

waste disposal and radioactive contaminants, the Branch participated in the hearings on the proposed refinery at Port Granby and the mine expansion of Elliot Lake. Specific problems associated with tailings at the Nordic Mine and with radon gas in March Township were addressed. Other requests for assistance with waste disposal included problems associated with the CDL brine disposal wells in Southwestern Ontario, the Appeal Board Hearing on the proposed landfill at Maple, the Assessment Board Hearing for the industrial waste disposal facility at Nanticoke and the appeal against the Ministry's Order for the installation of gas control devices at the Sabiston landfill site. Increased public interest in the area of waste disposal resulted in a corresponding increase in expertise available to participants at hearings and in the technical complexities of the proposals and the arguments against them.

The Branch was a major contributor to the preparation of the interim guidelines for landfill gas control. The Branch also provided guidance to the consultant retained to investigate landfill gas migration and prepared input to the formulation of regulations dealing with this problem.

A closer liaison was formed, partially through technical seminars and discussions, between the Branch and the Ministry of Transportation and Communications (MTC) to consider salt contamination resulting from highway de-icing practices. Procedures were formalized for direct resolution of contamination problems by MTC/MOE Regional Personnel.

The Branch is a major contributor to the Ad-Hoc Committee on Underground Storage of Petroleum Products in its interface with the Ministry of Consumer and Commercial Relations (MCCR) and industry to establish some control over buried storage tanks. A proposal by industry for the replacement of unprotected tanks was critically reviewed and modifications were suggested to MCCR. This included provision of a map of the Province indicating priority areas for tank replacement on the basis of environmental sensitivity to contamination.

In association with the Municipal Engineers Association/Ministry of the Environment (MEA/MOE) Course Development Committee, the Branch assisted in preparing sections of a manual that deal with hydrogeology for the Disposal by Landfilling course. The course is intended to assist administrators and operators in understanding the importance of landfilling in a proper manner.

Other activities included review and comment on various documents submitted to the Branch, including drafts of Bill 24, drafts of MNR Class EA for landfills, drafts of proposed landfill guidelines and regulations and a brief to the Minister on the deep-well disposal of liquid industrial wastes.

Water Resources Inventories

The results of the "Water Resources of the South Nation River Basin" in the eastern part of Ontario were published (Water Resources **Report 13**). The report deals with the occurrence, distribution, quantity, quality and the use of surface and ground waters within the basin.

This report will form an inventory base for the provincial interministerial committee that is examining ways of resolving problems of flooding, water supply and waste assimilation in the basin. The water resources study of the Holland and Black basins was completed. The study outlines surface and ground water resources in the Oak Ridges area north of Toronto and provides data for the Regional Municipality of York's official plan. A similar study in the Humber River and Don River basins was initiated and field work was completed.

The results of water resources inventory studies in the Lake Ontario drainage basin were published in three separate reports:

- (1) "The Hydrogeology of the IFYGL Forty Mile and Oakville Creeks Study Areas" (Water Resources Report 5b);
- (2) "The Hydrogeology of the IFYGL Duffins Creek Study Area" (Water Resources Report 5c);
- (3) "Geology and Water Resources of the East and Middle Oakville Creeks, IHD Representative Basins" (Water Resources Report 12).

The three reports summarize field studies undertaken by the Ministry as part of the International Hydrological Decade (IHD) and the International Field Year for the Great Lakes (IFYGL)—a joint Canadian and United States contribution to the IHD. Extensive hydrogeologic field work was carried out under both programs.

The Branch continued the groundwater probability mapping program in 1979-80 and the map "Region of Peel, Groundwater Probability" was published (Water Resources Map 3128). Mapping of the northern portion of the County of Simcoe was continued.

Map S100, "Hydrogeologic Environments and the Susceptibility of Groundwater to Contamination", was published. The map contains information on the susceptibility of groundwater (in Ontario) to contamination from surface or near-surface sources. This publication is only the first cursory stage in dealing with the inter-relationships of hydrogeology and hydrochemistry, and many complex environmental factors were generalized in order to present information for general planning purposes.

Regional liaison meetings concerning all surface and groundwater networks resulted in the following benefits and improvements:

- (1) All stations in the provincial hydrometric networks (streamflow, observation well and water quality) were reviewed relative to Ministry needs. New stations were identified to eliminate deficiencies and other stations terminated to eliminate redundancy. Overall, a significant reduction in analytical test requirements resulted from the modifications to the provincial water quality network.
- (2) Enhanced monitoring for toxic contaminants was initiated at selected stations within the provincial water quality network.

- (3) An enhanced monitoring program was implemented on 13 high priority tributaries to the Great Lakes with sampling frequency being keyed to hydrologic events.
- (4) The groundwater quality pilot study was expanded to measure the variability of water quality constituents under a variety of hydrogeologic conditions.
- (5) The water quality flagging program was made operational. This program compares existing water quality to provincial water quality objectives and summarizes the results.

Cartography and Drafting Services

In servicing the cartographic, drafting, graphic artwork and reproduction needs of Ministry programs, Branch staff completed 307 multi-color and monochrome maps and prepared 1,058 drawings, figures and illustrations.

Engineering, Scientific, Technical and Administrative and Data Services

Geophysical surveys involving seismic, resistivity, gravity, well-logging and VLF methods were utilized in groundwater contamination problems, for groundwater development projects and for evaluation of landfill sites. Specialized assistance was provided to the Alberta Department of the Environment regarding the application of geophysics to groundwater supply problems in Alberta. The soils laboratory continued to undertake a variety of analyses on soil samples submitted from various sources within the Ministry.

The Branch provided technical assistance to the Environmental Approvals Branch by reviewing and commenting on more than 50 environmental assessments, class assessments and environmental assessment guidelines. Most notable among the full environmental assessments reviewed was the Grand River Conservation Authority's "Environmental Assessment of Water Control Structures in the Grand River Basin".

The Branch helped examine waste assimilation problems on the Spanish River for Northeastern Region and on the Wabigoon River system for Northwestern Region. Waste assimilation analyses were also carried out for the Southwestern Region in updating the results of the original Thames River model analyses at Woodstock. A Stream Water Quality Assessment Procedures Manual, outlining procedures for field data collection and mathematical analysis of waste assimilation problems, was prepared and released to the Regional offices. The River Systems Newsletter was initiated and the Fourth Annual Water Resources Seminar on surface water quality management was held in co-operation with the Northeastern Regional Office.

The Branch continued development and testing of mathematical modelling techniques to describe effluent mixing zones in rivers and to predict critical concentrations of conservative and non-conservative substances. Stormwater management modelling packages were

distributed to municipalities and consulting firms and services were provided in their usage and application. The MOE Dynamic Water Quality Model was modified to include the new MOE stream biomass model, ECOL and applications were commenced for the Grand River basin study to show the effects of various point and non-point sources of pollution on the stream water quality.

A major program was initiated in conjunction with Environment Canada to identify the presence of solvent extractable organics in the St. Clair River and in local industrial effluents. Previous studies concentrated on volatile compounds. Rainbow trout were exposed to river water in on-shore tanks to identify bio-accumulative compounds and to determine the biological activity of those compounds through their rates of uptake and clearance.

Regulatory bio-assay testing of industrial effluents, also supported by Environment Canada, are to be concentrated on toxicant identification and significance to provide recommendations for waste treatment. The status of selected pulp and paper mills and the refinery industry in Ontario was reviewed with respect to effluent toxicity.

A compilation of aquatic toxicity test methods was assembled which covers procedures for fish and daphnia toxicity testing, fish reproduction tests, fish tainting evaluations, industrial waste investigative testing, data handling and interpretation and continuous flow-dosing apparatus and control systems.

The Administrative Group continued to provide word processing, reception, filing and mail services as required. The capacity for bilingual word processing was investigated, developed and was operational at year-end. It was further determined that facilities exist for interfacing with type-setting computers. The Data Services Group continued to maintain the Branch's three storage and retrieval systems—Water Well Records, Great Lakes Water Quality Data, River and Streams Water Quality Data—at the normal rate of 12,000 to 14,000 records per system per annum.

The Administrative and Data Section Supervisor served as Branch representative on the LIS User's Committee and as a member of the Subcommittee charged with developing a standard sample submission document. The acquisition of suitable data manipulation facilities was co-ordinated with Branch users and representatives from the Downsview Computing Centre and was operational at year-end.

Pollution Control Branch

Director: K.E. Symons

The Pollution Control Branch is primarily responsible for the planning of environmental control programs and development of associated legislation, regulations and guidelines to control the emission of contaminants and the quality of drinking water. Supplementary

functions include applied research, technology transfer, technical advisory service and delivery of certain aspects of the pesticides and noise control programs.

Municipal and Private

The Municipal and Private Section is responsible for policy development and program audit in connection with municipal water supply, pollution control and private sewage systems.

The **Municipal Sewage Unit** prepared draft policy and guideline statements governing the use of pressure and vacuum sewer systems for the collection and transmission of municipal sewage, and draft guidelines for the spray irrigation of sewage plant effluent on recreational lands. Other policy and guideline packages, either under preparation or close to finalization, included "Control of Combined Sewer Overflows and Wastewater Treatment Plant By-passing", "Energy Conservation in Sewage Treatment", "Application of Wastewater Treatment Plant Effluents to Agricultural Lands", "Disinfection of Wastewater" and "Wastewater Treatment Plant Sampling Procedures".

Unit staff developed a program to ensure the safe design, operation and maintenance of digester gas systems in plants owned or operated by the Ministry. This program will also be made available for implementation at municipally operated treatment plants.

The Unit assumed a lead role in setting up performance criteria for sewage works in connection with implementation of the Ministry's new water management policies. The criteria will govern incorporation of effluent requirements for new or expanded works into Certificates of Approval.

Unit staff were actively involved in local, interministerial, national and international committee work. Notable examples included participation on the I.J.C. Phosphorus Management Strategies Task Force; chairing of the Federal-Provincial Task Group developing national policies and guidelines on disinfection of sewage plant effluents; and representing Ontario on the Great Lakes and Upper Mississippi River Board-Sewage Collection and Treatment Committee.

The Province is responsible for administering federal grants to assist in the construction of municipal water and sewage services under the Community Services Contribution Program. The unit continued to co-ordinate the program within the Ministry and provide liaison with the federal government and other participating provincial ministries.

The Unit continued monitoring and evaluation of the phosphorus removal program in wastewater treatment plants. Assistance to Regional Staff in implementing the programs was also provided. In 1979, 220 wastewater treatment plants reduced inputs of phosphorus to our lakes and rivers by an estimated 7,000 tons.

The Municipal Sewage Unit is responsible for identifying and quantifying waste from municipal sources discharging into the Great Lakes from Ontario. All waste loadings, together with planned remedial programs and the abatement status of Ontario

municipalities discharging into the Great Lakes, are reported yearly through the I.J.C. Water Quality Board Annual Report.

The Unit concentrated considerable effort on the urban drainage management and sewage sludge utilization programs. A draft policy and guidelines package on urban drainage management was completed. A proposal was developed for an inter-agency committee to be charged with reviewing policies and co-ordinating implementation procedure development. In addition, staff members actively directed and participated in the Rideau River Stormwater Management Program, a large-scale urban drainage management demonstration activity. Implementation of the Guidelines for Utilization of Sewage Sludge on Agricultural Lands was initiated with implementation being co-ordinated jointly by the Ministry of Agriculture and Food and the Ministry of the Environment.

The Unit co-ordinates the development and operation of the computerized Management Information System. In conjunction with regional representatives from the Utility Operations Section, work was completed on a performance data collection system for Ministry-operated water and wastewater utilities. All Ministry-operated works were reporting to the system in 1979-80. Output reports on the annual and monthly operating data as well as summary reports on the plant capabilities, efficiencies and loadings were made available to the Regions on a quarterly basis. Work was begun on data collection for municipally operated utilities. When this work is complete, reports on utility performance for the entire Province will be produced. A complete listing of all water and sewage works in Ontario, as of December 31, 1978, was issued.

The **Private Sewage Unit** prepared seven Notices for distribution to agencies administering Part VII, The Environmental Protection Act, 1971. The Notices are designed to keep MOE and Ministry of Health personnel up-to-date concerning legal, technical and financial aspects governing private sewage systems. Six chapters of the Manual of Policy, Procedures and Guidelines for Private Sewage Disposal Systems were updated and copies sent to field offices.

A major project was initiated to revise Ontario Regulation 229/74 and to metricate the values. The Unit worked on the development of Guidelines for Septage Disposal, which are to be finalized in 1980-81.

The Unit prepared a report outlining four possible options for the future of the Boating and Marina Program. Meetings were held with regional personnel to discuss matters of mutual interest and concern. Information was also prepared for a press release on the program and for an open letter sent to marina operators thanking them for their continued support and co-operation. Summary reports were prepared on regional programs for ice-oriented activities and boating and marina operations.

MOE staff attended the Montreal Boat Show for the first time to answer inquiries on the Ontario regulation governing the discharge of sewage in and from pleasure craft.

The Advisory Committee on Private Sewage Disposal Systems held nine meetings and discussed 24 main subjects dealing with Part VII (The EPA, 1971). A Sub-committee was appointed to explore and report on all aspects of the licencing of contractors involved with the construction and/or emptying of sewage systems. By year-end the task had been essentially completed and a report prepared outlining three possible options.

The **Municipal Water Unit** co-ordinated the review of the Ontario Drinking Water Objectives; the revised document is to be published in 1980-81. The Unit also co-ordinated revision of the chlorination bulletin which is to be published in 1980.

The unit continued to serve on the Ontario Section AWWA Technical Committee, the Canadian Standards Association Sub-committee on Pressure Pipe, the MOE/Ministry of Health Committee on Household Water Treatment Devices and the Great Lakes Upper Mississippi, River Board of State Sanitary Engineers (Ten State) Standards Water Committee. Guidelines for ozone and chlorination disinfection devices were prepared by the latter committee. The Canadian Standards Association (CSA) canvassed opinion on the need for standards for household treatment devices; however, insufficient financial support prevented the CSA from starting on the standards.

The Unit reviewed the quality control and transportation of water treatment chemicals. Some difficulty was experienced in obtaining analyses of concentrated chemicals because of corrosion problems with the analytical equipment. Work in this area will continue.

The Unit reviewed the sampling requirements for drinking water quality and prepared a report with estimates of the number of analyses required to monitor important parameters.

Noise Pollution Control

The Noise Pollution Control Section received 369 new noise complaints in 1979-80. Complaints due to air conditioner noise were investigated in 40 instances, while 203 industrial noise complaints were reported and investigated.

Complaints of excessive noise resulted in investigations in 86 different communities throughout the Province. Prosecution of one firm was initiated for the excessive emission of industrial noise.

Several blasting noise complaints were under continuing investigation. Provincial officers were called upon to provide expert testimony in several actions launched by various municipal and private parties. A conviction registered under the Town of Napanee Noise Control Bylaw was appealed. Similarly, a Court decision on a charge involving noise from a private gun club in Uxbridge was being appealed by the Crown at year-end.

Fifty noise control bylaws pursuant to Section 95a of The Environmental Protection Act have been adopted by municipalities and approved by the Minister of the Environment. In support of this program, the fifth year of the Environmental Acoustics Technology training session sponsored by the Ministry was successfully completed. Acoustics IV, the highest course level in the

noise control training series, was finalized for presentation in May 1980.

The Section continued to provide technical comment on new land-use proposals and new industrial projects in the noise impact assessment program. Increasing attention was given to assessing class environmental impact statements, intergovernmental studies on transportation noise problems and use of lands subject to Ministerial zoning orders.

Pesticides Control

The Pesticides Control Section carries out its programs under The Pesticides Act, 1973, and Ontario Regulation 618/74. The Section promotes a balance between pesticide use and environmental protection. The Section classifies pesticide products, licences exterminators and vendors, issues permits for specific pesticides and uses, and provides training courses, seminars, study guidelines and material, including fact sheets, for industrial and commercial applicants for licences. The public is assisted through the dissemination of publications, especially at shows and fairs.

As part of its education function, the Section was involved in a considerable number of seminars and meetings, designed to assist applicants for licences and to keep established licencees up-to-date on materials, uses and safety procedures. Five major seminars covered landscape and plant maintenance, structural pest control, termite control, the food industry and grain elevator problems. In addition, a large number of courses were arranged in collaboration with other organizations, for those wishing to enter the pest control industry.

During 1970-80, the Section conducted 2,932 examinations and issued 7,435 exterminator licences, 1,183 operator licences and 3,945 vendor licences. The Section also issued 162 permits for the use of restricted pesticides on land, 420 permits for the application of pesticides to water and 232 permits for structural extermination.

The Summer of 1979 was the fourth consecutive one in which municipalities south of a line drawn between Sarnia and Toronto were urged to participate in mosquito surveillance programs. This area was designated by the Ministry of Health as a high-risk zone after 67 cases of St. Louis encephalitis were reported during the Fall of 1975. In 1979, due mainly to cool weather in the late Summer, mosquito populations remained relatively low and no human cases of encephalitis were reported. As a consequence, spraying activity was reduced.

Research continued to be conducted at selected water sites throughout the Province to determine the efficacy of a number of unregistered aquatic herbicides for a variety of plant problems.

The termite control program is directed primarily towards providing technical and financial assistance to municipalities experiencing problems with infestations of this insect. Public education, in the form of talks to ratepayers groups, schools and universities, is also a large part of the program. Surveys were carried out in all

Metropolitan Toronto boroughs and in 15 other communities. The Section conducted a termite survey using wooden bait blocks and visual inspection. In all, 3,000 bait blocks were examined and various degrees of activity were found. In addition, a research program was continued in Kincardine and Guelph involving the planting of 9,000 blocks.

Grants approved for chemical treatments and/or wood-soil contact removal for the control of termites were as follows:

MUNICIPALITIES	GRANTS
Town of Kincardine	35
Town of Leamington	2
Village of Elora	3
City of Guelph	7
Borough of East York	56
Borough of Scarborough	53
City of Toronto	238
Borough of Etobicoke	6
Town of Fergus	7

Altogether, 407 treatments were successfully completed and grants totalling \$199,912 were paid to homeowners.

Research and Development

The Co-ordination Section is primarily responsible for internal and external co-ordination and liaison in matters related to research and for administration of the research facility.

The Supervisor chaired the Ministry's Research Advisory Committee and maintained liaison with other research groups in the Ontario government through the Research Administrators' Committee and with the federal government through the Canada-Ontario Agreement. During the year, contact was maintained with the United States Environmental Protection Agency, particularly their drinking and wastewater research groups in Cincinnati, Ohio. Through membership on the Research Committee of the American Water Works Association, the Section participated in the Association's research program selection.

The Section administers the Provincial Lottery Program initiated in 1977. Eighteen health-related environmental projects were funded at a cost of \$1.8 million in 1979-80. Project subjects included PCBs, noise, phosphorus removal, ozone, disinfection, organics and leachate attenuation.

Applied Sciences

The Applied Sciences Section is an engineering group carrying out investigations and reporting on innovative concepts relating to environmental protection and enhancement. Eight studies were under way at year-end, primarily in the fields of improved construction techniques for municipal utilities in cold regions and large-scale private waste disposal systems. Four reports and four papers were prepared during 1979-80.

Wastewater Treatment

The Wastewater Treatment Section advances the quality of municipal effluent treatment in Ontario by

maintaining and upgrading the level of expertise in treatment technology through developmental research and by providing advice and assistance to planning, control and operational staff of the Ministry, municipalities and industry. In recent years, increasing emphasis has been placed on urban sources of wastewaters in addition to municipal sewage.

The Section maintains an analytical laboratory and the Ontario experimental Facility, a 5.0 MIGD activated sludge plant for use in developmental research work and operator training.

At year-end, the Section was involved in a total of eight research projects concerning municipal effluents, including ultra violet disinfection, aerobic digestion and organics removal. The Section was also involved with two major environmental studies on the Rideau and Grand Rivers, the Cornwall study for the development of a combined sewer overflow/urban drainage policy and a chlorine use inventory related to disinfection policy development.

The Section advised 26 municipalities throughout the Province on industrial waste treatability, new plant start-up, performance evaluation, operational problems and capacity evaluation. Section staff assisted in the review of design proposals for approximately 15 facilities.

The Section participated in the Activated Sludge Workshop, the Basic Sewage Treatment Course, the Chlorine Workshop, the Digester and Primary Treatment Course, the Sampling and Monitoring Course and the Nitrification Workshop within the Ministry's training program.

Contingency Planning

The Contingency Planning Section is responsible for the Province of Ontario Contingency Plan for Spills of Oil and Other Hazardous Materials, for assisting municipalities and industry in the development of their respective spill contingency plans, for assisting in related response training and for the maintenance of spill statistics.

During 1979-80, the Section received reports on 527 spill incidents. Of these, 353 involved the loss of oil; 81, the loss of liquid or solid hazardous materials; 18, the loss of gaseous materials and 75, the loss of other contaminants.

The Section participated in the preparation of Bill 24, an amendment to The Environmental Protection Act, 1971, which received third reading on December 11, 1979. The amendment increases spill notification requirements, creates clean-up and restoration duties for the owner and person in charge of spilled contaminants, increases liability, increases incentive for preventative programs, establishes a right for municipalities to respond to spills, and provides additional authority for the Minister to order or undertake counter-measures.

Water Technology

The Water Technology Section conducted research studies concerning ozone, trace organics (including haloforms), iron and manganese treatment, asbestos,

effect of treatment processes on treated quality, distribution systems and micro-macro-biological water quality.

The Province-wide survey on trace organic work was expanded to include 50 new locations. Locations previously monitored with yearly averages of over 30 ppm were continued; locations with yearly averages less than 30 ppm were removed from the survey. No locations in Ontario exhibited haloform concentration levels above those maximum acceptable concentrations quoted in the recently published federal document "Guidelines for Canadian Drinking Water Quality, 1978". Projects funded under the Provincial Lottery Program were concerned with alternate disinfection procedures at Belleville and the use of granular activated carbon to reduce haloforms in treated water at Brantford. The final report for the Belleville project was released.

A study at a Metro Toronto plant investigated the effect of eliminating pre-chlorination on treated water haloform levels and bacteriological quality: haloform levels were marginally lower and finished water bacteriological quality, as measured by standard techniques, remained unchanged.

The Lottery-funded health-related research project on the use of ozone as an alternative disinfectant was continued.

The asbestos monitoring program for all municipal water supplies was continued; the levels counted were low or below the detection limit.

Technical advisory work was carried out concerning new water plant commissioning, plant up-rating and plant operational and technical problems.

Environmental Approvals Branch

*Director: D.P. Caplice

The Environmental Approvals Branch provides an approvals function for companies, individuals and governmental agencies requiring approval for their projects under The Environmental Assessment Act and sections of The Environmental Protection Act and The Ontario Water Resources Act.

Environmental Assessment

The Environmental Assessment Section is responsible for managing the implementation of The Environmental Assessment Act and co-ordinating the review of projects coming under the Act. The Environmental Assessment Act is a decision-making tool in which the proponents of major projects demonstrate in a public document how and why the project is needed, and how detrimental environmental effects caused by the project during its construction, operation and retirement, will be lessened or eliminated. At year-end, the Section was

in the process of finalizing details involving implementation of the Act to the municipal sector and furthering analysis as to how the Act will be applied to private sector undertakings.

The Section continued co-ordination of the Ministry's submissions to the Royal Commission on Electric Power Planning; continued co-ordination of provincial government input to the Federal Environmental Assessment and Review Process hearings on the Eldorado Nuclear Ltd. uranium hexafluoride processing plant at Port Granby; continued participation in the hearings by the Environmental Assessment Board concerning uranium mining expansion plans by Denison Mines and Rio Algom Mines at Elliot Lake.

Concerning projects under The Environmental Assessment Act, Section staff continued to prepare environmental assessment guidelines, consult with proponents on the form and content of environmental assessments, review draft environmental assessments and prepare formal reviews of environmental assessment documents.

During the year, 18 reviews of environmental assessments were completed and 11 undertakings were given approval to proceed. Twenty-five formal submissions and 29 draft submissions were received under The Environmental Assessment Act. Among the undertakings given approval to proceed were those dealing with highway widenings (Ministry of Transportation and Communications); Welland and Port Colborne Water Treatment Systems (Ministry of the Environment); the Deer Lake Remote Airport (MTC). Among the submissions received for formal review were Generating Facilities on the Lower Musquash River (Orillia Water, Light and Power Commission); Montrose Dam and Reservoir (Grand River Conservation Authority); commuter stations and facilities (Toronto Area Transit Operating Authority); sewer systems and water systems (MOE); and the QEW between Burlington and Hamilton (MTC).

Section staff consulted on the Upper Thames Conservation Authority's proposed Glengowan flood control dam; the Inco hydro-electric power dam on the Spanish River; the Onakawana Development Limited lignite mine on the Ontario Northland Railway line south of Moosonee. They also reviewed 78 Ministry water and sewer projects conditionally exempted under Section 30 of The Environmental Assessment Act in October 1977 when the Act came into effect. Exemptions were granted because the projects were too far advanced to be properly assessed under the Act or too small to be of major environmental consequence.

Section staff addressed or otherwise participated in 80 illustrated lectures on The Environmental Assessment Act as well as at numerous conferences and seminars. They also supervised 18 Experience '79 projects.

Industrial Approvals

The Industrial Approvals Section processed 12 per cent more applications for Certificates of Approval in 1979-80 than in 1978-79. Again, considerable time was spent providing technical expertise to regional staff on pollution control methods and equipment, commenting

on preliminary proposals from industry and preparing responses to public inquiries.

Many applications for Certificates of Approval were more complex in nature because of increased energy conservation requirements, which resulted in new technological proposals being put forward for both process and control equipment. Approvals staff attended courses and seminars as required to keep pace with these developments. The number of waste disposal applications increased by 76 per cent due to initiation of the disposal site inventory program.

The Section continued to assist the Legal Branch by providing technical information and testimony as expert witnesses at legal prosecutions. During 1979-80, six convictions were obtained under Section 8 of The Environmental Protection Act, 1971. Section staff also spent considerable time preparing for and attending public hearings.

Major projects requiring staff input were put forward by St. Lawrence Cement in Mississauga, Eldorado Ltd. in Port Hope, General Motors in Oshawa, Prestolite Batteries in the Town of Vaughan, Canada Metals in Toronto, Pratt and Whitney in Malton, Consumers' Glass in Milton, Stelco in Nanticoke, Dofasco in Hamilton, Union Carbide in Welland, Abrasives Industries in Niagara Falls, Ontario Paper Co. in Thorold, Cyanamid Inc. in Niagara Falls, Columbia Carbon in Hamilton, Inco in Port Colborne, uranium mining industries in the Elliot Lake area, the pulp and paper industry in Northern Ontario and Ford Motor Co. in Windsor.

The cost of control equipment installed, according to the total number of applications processed, amounted to \$101,471,560 for water applications and \$78,467,130 for air applications.

APPLICATIONS PROCESSED*

April 1, 1979 - March 31, 1980

	Received	Approved	Cancelled	Denied
Air	727	618	85	6
Water	102	79	25	0
Waste	204	160	30	2
Total	1,033	857	140	8

*Does not include 396 applications processed by the Technical Support Section of Central Region and forwarded to the Industrial Approvals Section for checking and approval.

Municipal and Private Approvals

The Municipal and Private Approvals Section processes approval applications made by municipal and private agencies for water supply and distribution systems, waste water collection and treatment facilities,

*D.P. Caplice has been appointed director of the Ministry's Central Region, succeeded by T.W. Cross, former director of the Air Resources Branch. Both appointments were effective in September 1980.

and sites and systems associated with waste management programs. The Section also licences septic tank installers and waste haulers and provides technical approval to applications made under Central Mortgage and Housing Corporations' subsidy programs and the Ministry of the Environment's Regional Subsidy program.

In 1979-80, the Section processed approximately 3,000 applications and approved approximately \$700 million worth of water and sewage works for construction. The processing function was aided by the Ministry's transfer program in which selected municipalities assist with the technical review of applications. Additional municipalities were brought into the program during the year, and it is intended to extend this program further. The program was supported by draft design guidelines that were finalized during the year and are to be made available throughout the Province.

Considerable public interest was expressed concerning waste management disposal programs for which stricter requirements were adopted. The trend to larger regional sites being proposed to replace smaller inadequate facilities continued.

In 1979-80, the Section received 315 waste disposal site and systems applications of which 277 were approved. The applications resulted in ten hearings before the Environmental Assessment Board, four appeals, and various court actions. At year-end, there were 1,547 certified waste disposal sites and 1,064 waste management systems in Ontario.

Additional applications for licences from septic tank installers and waste haulers were received during the year; 3,171 Class 1 and 2 licences were active under Part VII of The Environmental Protection Act at year-end.

Land Use Co-ordination and Special Studies

The Land Use Co-ordination Special Studies Section advises other governmental agencies at all levels and the private sector on environmental matters related to land use planning. The Branch co-ordinates the Ministry's responses to regional development strategies, regional municipality official plans and other proposed land uses to ensure that all environmental aspects are considered. It initiates or carries out studies on environmental matters affecting land use, including the development of Ministry policies on land use. In June 1979, the staffing complement was reduced from nine positions to seven positions by the transferring of the economic analyst and the social analyst to the Program Planning and Evaluation Branch. This transfer was undertaken in order to centralize these skills in one branch.

One staff member was seconded to the Ministry Review Team to review policy and program development and program delivery functions. Special studies were carried out on land use buffers, analysis of complaints from environmental nuisances, wetlands and site reuse.

In 1979-80, the Section represented the Ministry on various interministerial or intergovernmental commit-

tees concerning the Agricultural Code of Practice, the clean-up of low level radioactive waste, the Canada-Ontario Agreement on Flood Damage Reduction, the Niagara Escarpment Commission Planning Area, Ontario base mapping, the Parkway Belt, cottage land policies, studies under the auspices of the International Joint Commission, the West Patricia Land Use Plan, urban drainage, mineral aggregate and wetlands.

The Section reviewed 35 documents submitted under The Environmental Assessment Act, 1975. The Section continued a major revision of the Land Use Planning Review Handbook, which is used by Ministry field staff in reviewing development proposals.

Section staff gave five speeches to conferences and seminars and five lectures at universities, polytechnical institutes and community colleges. Staff also supervised six Experience '79 projects.

Project Co-ordination Branch

Director: J.C.F. Macdonald

The Project Co-ordination Branch has prime responsibility for managing, co-ordinating and reviewing all Ministry capital sewage and water projects from inception to the completion of construction. During 1979-80, the Branch handled 244 construction contracts and administered a capital expenditure of approximately \$139 million. Of this amount, 42.1 per cent was paid out as subsidies under the Ministry's construction program for municipalities (see Table 1 at end of this section).

In addition, the Branch is responsible for the administration and budgeting of the Ministry's:

- direct grant program for providing grants to assist the construction of municipally-owned water and sewage facilities (1979-80 expenditure \$25.74 million);
- grant program to assist the construction of major water and sewage works in regional and restructured municipalities (1979-80 expenditure \$6.5 million);
- grant program for low-cost alternatives to communal systems in small communities (1979-80 expenditure \$1.423 million).

Project Management

The Project Management Section is responsible for the development and management of the Ministry's capital works program within the Ministry's six regions, excluding the large York-Durham area scheme. The Section administers the Ministry's Direct Grant Programs, including the development of budgets and the managing of cash flow, and provides project management services, when requested, on certain direct grant projects for small municipalities lacking resources or expertise for handling their own sewage or water works

projects (30 such requests were received during the year). The Section is frequently the delivery arm for other Ministries such as Northern Affairs, Treasury and Economics, Industry and Tourism, Housing and Intergovernmental Affairs in implementing sewage and water programs, particularly where such programs are carried out as provincial priorities.

Since March 1979, the Section has administered the expenditures under the Federal Community Services Program (CSCP), which replaced the former Canada Mortgage and Housing Corporation (CMHC) infrastructure assistance program. CSCP grants totalling \$31.0 million, including \$11.5 million for Ministry-financed projects, were committed for payment in 1980-81 (see Table 2 at end of this section).

Two Class Environmental Assessment Documents (one for the expansion and upgrading of existing sewage works, the other for the expansion and upgrading of existing water works) were completed during the year and were submitted for approval under The Environmental Assessment Act. These documents, when approved, will serve as the basis for the planning and implementation of all expansions or upgrades of existing sewage or water systems falling within such classes and will provide guidelines for municipal undertakings of this type from the date when such undertakings are proclaimed as coming under The Environmental Assessment Act.

In Northern Ontario, a number of high-cost projects were initiated, with funding support from the Ministry of Northern Affairs, and ongoing schemes were continued under the Branch's direction. Approximately \$11 million was provided by Northern Affairs from direct administration by the Branch for these projects.

Two subsidy agreements under the General Development Agreement of the DREE/RPB (Department of Regional Economic Expansion/Regional Priority Budget) programs continued to be administered by management committees, which include representatives from DREE, the Ministry of Northern Affairs and the Ministry of Intergovernmental Affairs and the Branch's project manager for the particular region. The Northwestern Management Committee administers a \$50.8 million program that includes sewage improvements in Thunder Bay and Ignace. The Northeastern Management Committee administers a \$30.0 million program that includes services for industrial parks in Parry Sound, Sudbury and North Bay, as well as infrastructure in Timmins. The DREE/RPB program also included expenditures for infrastructure projects for single industry resource communities such as Nakina, Longlac, Geraldton, White River and Hornepayne.

Close liaison continued with the Ministry of Northern Affairs to administer new initiative programs in Northern Ontario. Northwestern Region projects were located in Balmertown, Ignace, Marathon, Jaffray & Melick, Ear Falls and Kenora. Northeastern Region projects were located in Chapleau, Cobalt, Moonbeam, Haileybury, North Shore and Sturgeon Falls.

With the promulgation of Bill 122, which provides for the establishment of Local Service Boards, the Branch is in a position to prepare agreements with unorganized communities for the first time. The communities of

Cogama and Foleyet will be the first to benefit from the new arrangements. Preliminary test drilling for a well water supply has already been completed in Cogama.

Projects funded jointly by the Ministries of Northern Affairs and Environment have proven to be effective not only in terms of the MOE's objectives, such as pollution control, but also as a means of implementing the broader provincial objectives of improving the infrastructure necessary for growth and development.

In the Central Region, the first two contracts valued at \$3.0 million were tendered for a \$40 million four-year program for sewage and water services for the community of Keswick in the Township of Georgina.

Wasaga Beach sewage and water works projects, commenced in 1978-79, continued under design and construction with funding provided through the Ministry of Natural Resources. These projects will have cost about \$16 million and are scheduled to be completed in 1981-82. An expenditure of approximately \$6.5 million was allocated to the projects in 1979-80.

In the West-Central Region, the Haldimand-Norfolk Provincial area scheme was accelerated in 1979-80 to meet the Ministry of Housing's target date of September 1980 for having water servicing for the first phase of the new Townsend Community. The scheme involved the construction of seven miles of large-diameter trunk watermains. Fifteen separate contracts were tendered for these works.

York-Durham Projects

Construction continued on schedule on the York-Durham Sewage System and the York Water System with expenditures in 1979-80 of \$42.57 million and \$6.71 million respectively. Included was \$16.87 million for the Duffin Creek Water Pollution Control Centre, which was intended to be put into operation in late 1979. A decision was made in November, however, to postpone start-up until Spring 1980. The new \$60 million plant was scheduled to receive raw sewage in April 1980. Its operation was intended to allow three existing plants in Regional Durham and two plants in Regional York to be taken out of operation by April-May 1980.

Construction of the first phase of the York Water System was virtually completed during the year, resulting in Metro Toronto water becoming available in Woodbridge, Maple, Richmond Hill, Unionville and Markham.

Design and Equipment Review

The Design and Equipment Section reviews and evaluates design submissions received for approval purposes from consulting engineers for all sewage and water projects where contracts are to be let by the Ministry. The submissions are evaluated from the viewpoints of sanitary, mechanical and electrical engineering, and cost effectiveness, including energy utilization and conservation.

In 1979-80, the Section processed approximately 170 submissions, including major sewage and water projects in South Peel Region, York-Durham Area and

Haldimand-Norfolk Region. In addition, the Section was involved in the preparation of design guidelines and standard specifications for equipment.

Ground Water Development

The Ground Water Development Section supervised five test-drilling contracts and one well-construction contract with a total value of \$281,000. The Section undertook four ground water surveys and seven special investigations, involving well testing and analysis of well and aquifer performance for Ministry projects. The Section was also extensively involved in the investigation and resolution of well water interference complaints arising from Ministry contractors' dewatering activities in six water and sewage construction projects. In addition, the Section reviewed reports on low-cost alternative proposal schemes.

Project Control

The Project Control Section co-ordinates the compilation of data and the preparation of schedules relating to anticipated expenditures and cash flow for Ministry sewage and water works programs. The Section monitors and records commitments and expenditures and advises on the scheduling of contracts to meet budgetary requirements. Various statistics on costs are compiled as required.

The Section continued its active participation in the Ministry's Project Evaluation Group, which assesses the priorities of proposed works and assigns MBR gradings. (see Tables 1 and 2 at the end of this section and Graphs I to IV in appendices).

Claims and Contracts

The Claims and Contracts Section handles disputed claims for payment made by contractors, third parties, etc., and assists in arbitration or litigation arising from such claims. The Section investigates technical and contractual bases for claims and reviews matters with consulting engineers and expert witnesses.

The Section receives tenders, reports on tenderers' financial statements to Senior Management, carries out documentation related to the awarding of contracts, arranges for the execution of agreements and deals with Notices of Claim under the Mechanics Lien Act.

The workload of construction claims carried to arbitration or litigation continued to be heavy and necessitated considerable close liaison with counsel of the Legal Services Branch and the Ministry of the Attorney General in relation to examinations for discovery, preparation of documents and hearings.

Special Activities

The Special Activities Unit provides special inspection of construction; investigation of unusual construction problems; administration of the Ministry's prequalification system for concrete sewer pipe plants; representation on committees involving standardization, metrication and co-ordination; and other administrative and support activities.

The Unit carried out approximately 95 field inspections of Ministry sewer and water works projects during the year. These included inspections during construction, at substantial completion, and at the end of the one-year maintenance period. In addition, approximately 15 man-days were spent on the investigation and resolution of special construction problems.

The Construction Inspectors' Courses (Nos. 1 and 2), sponsored jointly by the Ministry and the Municipal Engineers' Association, were again held. Approximately 60 candidates from municipalities and consulting engineering companies attended each of the one-week courses.

Staff spent considerable time through the year on the review and drafting of standards and specifications and in the evaluation of new projects proposed for incorporation into Ministry works.

Field Services

The Field Services Section includes specialists in mechanical and instrumentation equipment fields and provides technical advice and skills with respect to new and operational sewage and water works installations. These activities cover the design, construction and maintenance phases of Ministry projects.

In addition, the Section provides emergency service as required and carries out maintenance audit inspections of operational plants.

During 1979-80, 76 per cent of staff time was spent on the capital works program; 24 per cent on operational installations.

TABLE I
PROJECT CO-ORDINATION BRANCH

Volume of activity under Capital Construction Program during 1979-80

1. Capital Expenditure		139,482,100
Sewage Works		110,574,900
Water Works		28,907,200
Provincial Projects		138,303,700
Municipal Projects		1,178,400
Provincial Subsidy		58,785,043
% of total expenditure		42.1
2. Construction		
Contracts Tendered	— No.	93
	\$ Value	93,032,521
Contracts Started	— No.	110
	\$ Value	114,456,000
Contracts Completed	— No.	122
	\$ Value	135,573,000
Contracts Under Construction		
During the Year		244
Average Number of Contracts Under		
Construction in each month		130

TABLE II
PROJECT CO-ORDINATION BRANCH

Grants to municipalities for sewage works and water works during 1979-80.

1. MBR priority evaluations			
(1) Direct Grant Program requests			
Ruled eligible	38		
Rejected	19		
(2) Private Systems Program requests			total
Ruled eligible	38		evaluated
Rejected	8		103
2. Direct Grant Program payments			
(15% to 75% grants)			\$25,740,000
3. Private Systems Grant Program payments			
(75% grants)			\$ 1,423,000
4. Grants to Regional and Restructured			
municipalities (15% grants)			\$ 6,497,800
5. Federal CSCP Grant commitments for			
payment in 1980-81 (administered by MOE)			\$31,000,000

Waste Management Branch

*Director: L.F. Pitura

Experimental Plant for Resource Recovery

The Transfer Station Section of the Experimental Plant continued in routine operation with no significant problems. Modifications to the corrugated cardboard recovery system in mid-year resulted in a substantial increase in the recovery of corrugated cardboard, the highest unit value commodity generated at the plant. The resource recovery facilities remained in a shake-down phase until July 1979 at which time equipment problems and operational procedures had been resolved sufficiently to permit routine operation at the production goal of 200 tonnes per day. As a result of explosions in the primary shredder area, extensive damage reduction measures were undertaken and completed in the Fall of 1979.

With the completion of a composting screening system in April, replacement of a conveyor in September, and improved operating procedures, routine operation of the composting facilities was achieved early in 1980, with compost throughout being controlled at approximately 70 per cent of design.

Equipment was received for future installation to improve the quality of the recovered ferrous product. Favorable results of test work with a screening system to remove the fines from the refuse derived fuel will likely result in the installation of production screening equipment. A preliminary study relating to occupational health hazards was undertaken.

Marketing and Market Development

Marketing of the recovered ferrous product (5 per cent of incoming waste) continued with the material being sold both as recovered in shredded form and densified by baling. The largest end-user of the shredded ferrous was Lake Ontario Steel Company, a market steel mill. Densified bales were marketed to several iron and steel foundries including: General Motors Canada (St. Catharines Foundry), Brown and Boggs Foundry and Machine Company, McCoy Foundry, CAE-Cleveland Abrasives and Bell City Foundry.

The major recovered product at the Experimental Plant is the light fraction for refuse derived fuel (RDF). The full-scale demonstration project, involving the use of this material as a supplementary fuel at the Canada Cement Lafarge Company's Woodstock facilities, continued. Successful operation was attained with fossil fuel

substitution rates of up to 20 per cent with no adverse effects on clinker quality. A continuous 17-day test burn, involving the use of refuse derived fuel at substitution rates ranging from 20-40 per cent, was planned for the Spring of 1980. Other market development areas being explored for the use of the light fraction include use as an energy source in the brick manufacturing industry and in fire log manufacturing. Additional work was conducted on the use of this fraction for making mulch, a finely ground cellulose product widely used in hydroseeding. Since it also has long-term potential as a source of cellulose fibre, preliminary studies were carried out on the separation of plastic from the RDF fraction and on the use of RDF as a feedstock for making industrial cellulose insulation or building board.

Several test trials involving the use of compost from the Experimental Plant were carried out during the year. These preliminary trials, conducted by Northumberland County, the Metropolitan Toronto Conservation Authority and TCG Materials Limited of Brantford, were all considered successful. Large tonnage demonstration projects were being planned for the Spring of 1980 with these groups, with additional work to be conducted in the Regional Municipality of Hamilton-Wentworth. Several studies are under way to determine the potential of using compost as a growing medium for nurseries and as a turf builder for parks and recreational areas. Compost was used in a hydroseeding application on a test portion of the Highway 403 extension.

Material/Energy Recovery

The technical and economic feasibility study of the Peel Resource Recovery Project was completed in December 1979. Peel Council requested the Province to review possible restructuring of the project in order that the Region would not be assuming the full amount of risk. The Watts from Waste Project was reviewed and, in view of the estimated costs and the poor performance of similar plants in the United States, a decision to proceed was deferred. This decision will be reconsidered on completion of the Metro Toronto Master Plan for waste management, which will assess Watts from Waste in comparison with Toronto District Heating or conversion of Ontario Hydro's R.L. Hearn Plant to garbage firing.

The Ministries of Environment and Energy are working together on a joint Energy from Waste Program. Feasibility studies under way involve the City of North Bay, the City of St. Catharines, the City of London and the Region of Niagara.

Source Separation

Extensive monitoring of four pilot projects on residential source separation in co-operation with Etobicoke, the City of Toronto, Aurora and Georgetown was completed. A report on the results of these projects will be completed in mid-1980. The recovery of waste newspaper from municipalities in Southern Ontario will be expanded to accommodate the demand for waste fibre at the Ontario Paper Company de-inking plant in Thorold.

Project Paper Recycling was implemented in 17 government buildings in Metropolitan Toronto and

*L.F. Pitura was appointed director, Organization Policy Branch, Management Board of Cabinet. He was succeeded as director of the Waste Management Branch by C.J. Macfarlane, former director of the Ministry's Central Region. Both appointments were effective in September 1980.

involved approximately 8,000 employees recovering fine office paper. Means of promoting the extension of the concept to other types of buildings such as large office buildings, schools and municipal buildings, were under consideration at year-end.

Solid Waste Management

The Ministry is sharing with Metropolitan Toronto the development of a solid waste master plan using a computer model developed by the Ministry. The plan will provide a long-term framework for waste management planning including resource and energy recovery for Metropolitan Toronto.

Waste management studies were carried out in Sault Ste. Marie and the District of Muskoka.

During the fifth and final year of the derelict motor vehicle program, ten new contracts were developed at a total cost of \$50,000. No new sites were established. Altogether, a total of 57 operational facilities were set up, and more than 27,000 hulks were collected for recycling during the program.

The Waste Management Improvement Program generated 144 new contracts with municipalities at a cost of approximately \$450,000. The majority of work was directed at upgrading existing waste disposal facilities; however, several projects involved green-belt, beach and river side clean-ups.

The gas migration study proceeded with development of a detailed work plan and site selection. This three-year study will cost approximately \$287,000.

The Branch contracted with the Ministry of Natural Resources for a Remote Sensing Study to be carried out to develop techniques such as true color, infrared and thermal imagery for application in waste management studies. This \$90,000 study will take approximately 18 months and should provide data that will complement efforts in the gas migration and site identification studies.

A site identification study was commissioned for approximately \$100,000 to attempt to locate and identify old waste disposal facilities that were closed prior to 1971 when the Ministry began a certification and documenting program. Future activities are to include field investigations, remedial measures and monitoring.

Disposal of Liquid Industrial Wastes

The Waste Management Branch continued with a number of activities to implement the Ministry's seven-point program for the disposal of liquid industrial wastes. These include refinements to the waybill monitoring system; the receipt of a report by M.M. Dillon Limited on the storage and handling of PCBs; the retaining of James F. MacLaren Limited for the reporting on requirements for a variety of waste treatment facilities; the funding of costs for the conversion of the Duffin No. 2 WPCP (Ajax) to a liquid industrial waste treatment facility; the development of various guidelines and regulations; and the establishment of a task force to develop a "perpetual-care" program for waste disposal sites.

The James F. MacLaren interim report was completed in the Fall of 1979 at which time public

interest groups were requested to comment. The final site selection and preliminary design were being completed at year-end.

Proposed Liquid Industrial Waste Treatment Facilities

The Environmental Assessment Board is currently holding public hearings under The Environmental Protection Act, 1971 to consider the proposal to convert the Ajax WPCP to a 8.8 MGY liquid industrial treatment plant. The Ministry entered into an agreement to provide up to \$270,000 to fund the hearing and engineering costs.

The environmental assessment documents for two interim solidification projects were filed, and it is expected that a hearing would be held by the end of 1980. The Ministry is a co-proponent with two private firms, Walker Bros. Quarry and Browning-Ferris.

A study by M.M. Dillon was completed and the Middleport transformer station near Brantford was selected by the Ministry as the proposed location for an interim PCB storage facility. At year end the firm was completing the environmental assessment document for submission.

Transfers of Liquid Industrial Wastes

The waybill system for the controlling of the movement of liquid waste underwent a number of revisions. By mid-Summer 1980, the program is expected to be automated, thereby providing improved statistical data and more efficient information for the Ministry's abatement control program.

PCB Handling and Disposal

A regulation was drafted to control the movement of PCB wastes. The regulation is intended to supersede the existing guidelines in several areas.

Monitoring techniques were refined to where levels of PCB below the background level can be measured consistently. At year-end, the Ministry was also involved in funding research into a number of innovative means of destroying PCB wastes.

Pulp and Paper Industry Incentives

During 1979-80, ten companies made submissions for grants from the Employment Development Fund. Each submission was reviewed by the Advisory Committee, which included Ministry Staff. The review included the following aspects: modernization, environmental content, employment woodlands, Canadian content, marketing, financing. At several mill locations, major modernizations will improve the environmental effects significantly. Some existing Control Orders were changed to include items in the five-year plans. A number of new Control Orders were issued to identify environmental changes in the five-year plans.

As of April 28, 1980, the status of the grant program was as follows:

	Source and Amount of Funds in Million \$			
	Ontario	Canada	Company	Total
Abitibi-Price Inc.	15.0	7.5	173.7	196.2
American Can of Canada			Submission under review	
Boise-Cascade Canada			Submission under review	
Domtar Inc.	10.5	5.3	117.8	133.1
E.B. Eddy Forest Products	16.7	8.3	200.0	225.0
Great Lakes Forest Products	25.3	12.7	297.0	335.0
Kimberly-Clark of Canada			Submission under review	
MacMillan Bloedel			Submission under review	
Ontario Paper Company	21.3	10.7	228.0	260.0
Spruce Falls Power & Paper	4.7	2.3	63.8	70.8
GRAND TOTAL	93.5	46.8	1,079.8	1,220.1

Radioactivity

Radioactive waste is of growing concern to the Ministry of the Environment. Accordingly, the Waste Management Branch has had, from its inception, a nuclear physicist who deals with the problematical subject.

As the present legislation (1946 Atomic Energy Act) gives the federal government's Atomic Energy Control Board overall responsibility for radioactive materials. The scientist works closely with the Board on various projects, including the clean up of low-level radioactive waste in Port Hope and Bancroft to ensure that Ontario's interests are properly addressed.

The scientist provides a consulting service for other Branches and for the Regions. He comments on the significance of radionuclides analyzed in environmental samples and undertakes special studies on request—e.g., regarding radioactive materials at Deloro and natural radioactivity on Great Manitou Island in Lake Nipissing.

He has close contact with the Radiation Protection Service of the Ministry of Labour and aids the Service in work connected with the Province's Nuclear Contingency Response Plan.

Mining

Known mineral tailings masses in the Province of Ontario cover 24,767 acres (38.7 square miles) and contain 1,077,352,000 tons of tailings. Active mines generate an additional 100,243 tons of tailings per day.

Several hundred tailings disposal areas exist in Ontario, ranging in size from less than two acres to more than 1,000 acres. Their usual size is from 50 acres to 300 acres.

The Waste Management Branch released a major report entitled "The Chemical Characteristics of Mineral Tailings in the Province of Ontario". This report contains the levels and probable impacts of various chemical substances found in tailings areas across Ontario.

regional operations and laboratories division

Assistant Deputy Minister: W.B. Bidell

The Regional Operations and Laboratories Division provides a wide range of services including: environmental protection, abatement programs and complaint investigations; environmental assessment; and the operation and management by Ministry staff of water and sewage works systems constructed by the Ministry.

In addition, the Division provides analytical and research support to the Ministry through the operation of provincial and regional environmental laboratories.

Northwestern Region

Director: R.M. Gotts

Industrial Abatement

During 1979-80, Control Orders were issued to Domtar Packaging Limited, Red Rock and Kimberly-Clark of Canada Limited, Terrace Bay (both pulp and paper mills), and to Industrial Grain Products Limited, Thunder Bay, which produces grain starch. Control Orders for Great Lakes Forest Products Limited (Dryden), Boise Cascade Canada (Fort Frances), American Can of Canada Inc. (Marathon) and Great Lakes Forest Products (Thunder Bay) were under preparation at year-end.

The Control Orders will require the companies to carry out comprehensive air and water abatement programs in order to achieve substantial reductions in 1) biochemical oxygen demanding substances, suspended solids and toxicity in liquid effluents, and 2) total reduced sulphur, total suspended particulate, sulphur dioxide and oxides of nitrogen in air emissions.

Great Lakes Forest Products, Abitibi-Price and Domtar were also awarded grants under the Pulp and Paper Industry Facilities Improvement Subsidiary Agreement to modernize and install pollution abatement equipment. The pollution abatement programs outlined in the grants have generally been or will be covered in the Control Orders to the individual mills.

The extensive air pollution abatement programs directed towards reduction of dust emissions from the terminal grain elevators in Thunder Bay were essentially completed during 1979-80. Levels of dust emissions from these elevators were approximately five per cent of the pre-abatement levels of the early 1970s. An evaluation of the programs at each of the elevators will be carried out to establish if further abatement measures are required.

A number of parties approached the staff on Ministry requirements concerning gold and silver mine development. A few of the developments were expected to commence operation during 1980-81.

Municipal and Private Abatement

Staff continued to monitor all communal water and sewage treatment facilities within the Region. Special bacteriological and chemical water quality studies of communal water distribution systems, sewage treatment plant loading studies and water pollution surveys were conducted.



Ontario

Ministry of the Environment

REGIONS AND OFFICES IN ONTARIO

- Regional Offices
- District Offices



Regional & District Offices

NORTHWESTERN REGION:

Thunder Bay Regional Office,
435 James St. S.
Thunder Bay P7C 5C6
Tel.: 807/475-1205

Kenora District Office,
808 Robertson St.,
Kenora P9N 1X9
Tel.: 807/468-5578

NORTHEASTERN REGION

Sudbury Regional Office,
199 Larch St.,
Sudbury P3E 5P9
705/675-4501

Timmins District Office,
83 Algonquin Blvd. W.,
Timmins P4N 2R4
Tel.: 705/264-9474

Sault Ste. Marie District Office,
445 Albert St. E.,
Sault Ste. Marie P6A 2J9
Tel.: 705/949-4640

North Bay District Office,
1500 Fisher St.,
Northgate Plaza,
North Bay P1B 2H3
Tel.: 705/476-1001

Parry Sound District Office,
74 Church St.
Parry Sound P2A 1Z1
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CENTRAL REGION

Suite 700, 150 Ferrand Dr.,
Don Mills M3C 3C3
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Barrie District Office,
12 Fairview Rd.,
Barrie L4N 4P3
Tel.: 705/726-1730

**Muskoka-Haliburton
District Office,**
Gravenhurst P0C 1G0
Tel.: 705/687-3408

Peterborough District Office,
139 George St. N.,
Peterborough K9J 3G6
Tel.: 705/743-2972

Halton-Peel District Office,
1225 White Oaks Blvd.
Oakville L6H 2B9
Tel.: 416/844-5747

Huntsville Sub-Office,
100 Main St. E.,
Huntsville P0A 1K0
Tel.: 705/789-2386

SOUTHWESTERN REGION

London Regional Office,
985 Adelaide St. South,
London N6E 1V3
Tel.: 519/681-3600

Windsor District Office,
250 Windsor Ave., 6th Floor,
Windsor N9A 6V9
Tel.: 519/254-5129

Sarnia District Office,
242 A Indian Rd. South,
Suite 209 S.,
Sarnia N7T 3W4
Tel.: 519/336-4030

Owen Sound District Office,
1180 Twentieth St.,
Owen Sound N4K 6H6
Tel.: 519/371-2901

Chatham Sub-District Office,
435 Grand Ave. W.,
Chatham N7L 3Z4
Tel.: 519/352-5107

WEST CENTRAL REGION

Hamilton Regional Office,
140 Centennial Parkway N.,
Stoney Creek L8E 3H2
Tel.: 416/561-7410

Cambridge District Office,
400 Clyde Rd.,
Cambridge N1R 5W6
Tel.: 519/623-2080

Welland District Office,
637-641 Niagara St. N.,
Welland L3C 1L9
Tel.: 416/735-0431

Simcoe Sub Office,
645 Norfolk St. N.,
Simcoe N3Y 3R2
Tel.: 519/426-1940

SOUTHEASTERN REGION

Kingston Regional Office,
133 Dalton St.,
Kingston K7L 4X6
Tel.: 613/549-4000

Ottawa District Office,
2378 Holly Lane,
Ottawa K1V 7P1
Tel.: 613/521-3450

Cornwall District Office,
4 Montreal Road, 2nd Floor,
Cornwall K6H 1B1
Tel.: 613/933-7402

Belleville District Office,
15 Victoria Ave.,
Belleville K8N 1Z5
Tel.: 613/962-9208

Pembroke District Office,
1000 MacKay St.,
Pembroke K8A 6X1
Tel.: 613/732-3643

Water and sewage construction projects, including sewer and watermain extensions, continued in various municipalities. Projects were completed or are being completed at Kenora, Red Lake, Rainy River, Geraldton, Longlac and Nakina. Construction of a sewage treatment plant in Atikokan was begun and new projects were initiated in Rosport, Marathon and Balmertown. Ear Falls and Beardmore officially opened their water and sewage treatment facilities.

Staff continued to inspect all municipal and provincially operated waste disposal sites within the Region. Funds were provided through the Waste Management Improvement Program to improve the operation of many municipal sites.

Project Remove was completed this year with the removal of all vehicles from the Pickle Lake derelict motor vehicle site.

The Cottage Pollution Control Program was carried out along the north shore of Lake Superior, Walker Lake in Schreiber and the Sibley Peninsula.

The Boating and Marina Inspection Program was continued with emphasis on marinas in Thunder Bay.

There was an increase in the number of exterminator licences issued under The Pesticides Control Program, particularly for brush and weed control. In co-operation with Lakehead University, the land exterminator licencing program was integrated into the forestry degree program. There continues to be increased general interest in pesticide use, particularly in forestry pesticide use programs.

Air Quality

The **Air Quality Assessment Unit** continued its monitoring program in seven urban centres in the Region and issued annual air quality reports for these areas for the year 1978. The air quality network was extended to an eighth community—Red Rock—in early 1979. Special air quality surveys and vegetation, soil and snow sampling studies were also conducted near selected local industrial air pollution sources. Complaints of vegetation damage were investigated following a sulphur fire in Thunder Bay and a release of chlorine from a pulp mill in Dryden.

Presentations were made to public participation meetings concerning the preparation of Control Orders for pulp and paper mills in the Region. Plans were developed to begin a regional precipitation sampling program and to commence a long-term study of the effects of acid precipitation on the terrestrial ecosystem of northwestern Ontario.

Water Quality

The **Water Resources Assessment Unit** continued its operation of a 47-station water quality monitoring network for lakes and streams in the Region (notably those affected by industrial and municipal wastes or urban runoff). The Unit conducted regular sampling at 11 sites in support of the tributary monitoring program of the International Joint Commission for streams entering Lake Superior.

Other major survey activities included participation in the second year of a joint federal/provincial study of mercury pollution at the Wabigoon-English River systems; preliminary sampling of 40 lakes in the Atikokan area with respect to both pre-operational monitoring of the Atikokan thermal generating station and the more general concerns relating to the effects of acid precipitation in the Province; analysis of samples from wells in the Thunder Bay area for chemical quality; a water quality evaluation of Confederation Lake conducted to assess the impact of mining activities; an assessment of the water quality of 60 lakes across the Region for potential effects by lakeshore development of residences and summer cottages. Presentations were made at public participation meetings concerning the preparation of Control Orders for two pulp and paper mills.

Environmental Planning

The **Approvals and Planning Unit** continued to co-ordinate regional responses to environmental impact statements and to review municipal subdivision proposals. The Unit took an active role in project evaluation through staff participation in technical advisory committees and pre-submission consultation with many proponents. Staff assisted with the documentation of regional computer data-handling needs and equipment selection.

Laboratory Operations

The analytical workload over the year was similar to the level of the previous year. Additional analytical capabilities were acquired, including low-level alkalinity, auto-analyzer chloride and dustfall particulate identifications. Analytical techniques were revised to improve the detection of fecal contamination in well water samples.

In addition to providing analysis service for MOE programs, the Regional Laboratory in Thunder Bay provided analytical support for both MNR and federal fisheries programs.

Northeastern Region

Director: C.E. McIntyre

Industrial Abatement

One new Control Order and one Amending Control Order were issued in 1979-80. The Amending Control Order was issued following public input at a meeting. All items of all existing Control Orders were met in terms of intent with the exception of one where charges were pending at year-end. Four other Control Orders were in various stages of preparation. In total, 312 complaints were received and investigated; virtually all were resolved. In addition, 212 spills were reported, investigated and adequately cleaned up.

The earth-filled dam on Farr Creek, which washed out in the Spring of 1979, was replaced with the

co-operation of the Ministry of Natural Resources. Unfortunately, due to weather conditions during the construction period, difficulties were encountered that remain to be resolved during 1980-81.

Twenty-two charges were laid against a mining operation in the Region with the initial court decision being 'not guilty'. This decision was appealed and will be heard in the Fall of 1980. A meeting was arranged for public input to a request for amendment of another Control Order. The public response was in favor of the proposed amendment and an Amending Order will be issued.

Municipal and Private Abatement

One Minister's Order, nine Control Orders (eight under Part VII), and three successful prosecutions were initiated during 1979-80. In addition, two stop orders were issued to prevent aerial spraying of pesticides by unlicensed applicators. The spraying proceeded after proper licences had been obtained.

Forty-one inadequate waste disposal sites were closed, 106 inadequate waste disposal sites were upgraded, while 15 new waste disposal sites were under development at year-end. More than 8,000 derelict motor vehicles were collected in the Region for recycling.

Twenty-five private-system funding projects were under development in the Region in 1979-80. More than 750 complaints were received and investigated by Municipal and Private Abatement staff and 55 spills were adequately cleaned up. Five waste management studies were under way in the Region, while six pollution surveys were completed.

Air Quality

Approximately 200 instruments and recorders monitored air quality throughout the Region. The suspended particulate and dust fall surveys in the Elliot Lake area continued to supply information for judging the future impact of the expanded uranium mining industry.

With the assistance of the Air Resources Branch, the installation of a real-time telemetered data acquisition system was completed in early 1980. The system collects, averages and relays Sudbury air quality and meteorological data from a number of field stations to the regional office, where it is printed out in hard copy and also stored on magnetic tape. This system permits an improved monitoring of the effectiveness of abatement measures being carried out at Sudbury-area smelters.

Special air quality surveys were undertaken during the Inco Limited strike to monitor the influx of sulphates and nitrates into the Region while Inco was not operational.

The Plant Pathology Unit collected more than 1,700 samples of vegetation and soils throughout the Region and investigated 59 complaints of suspected air pollution injury to vegetation. Of the complaints, 23 were determined to be related to air pollution problems. The major air pollutant causing injury to vegetation was ozone, which is carried into the Region as a result of

long-range transport. In order to better monitor the effects of vegetation of air pollutants imported by long-range transport, 16 white pine plots and 10 tree seedling plots were established. It is intended to expand this program in 1980-81.

An International Air Pollution Workshop was hosted in Sudbury, the first time this workshop has been held in Canada. A major report on air quality assessment studies in the Timmins area was published and released in April 1979.

Water Quality

Altogether, 177 Water Quality Monitoring stations were regularly sampled and 12 stream flow recording stations were maintained. Thirty-seven permits to take water were issued, while 100 lakes in the Region were sampled as part of a continuing program to determine the effects of acid rain. Staff provided assistance to the Ministry of Natural Resources in the sampling of a further 119 lakes related to this program.

Major reports were issued on the water quality of the Lower Sturgeon River, the water quality of Eagle Lake near South River and the water quality of Trout Lake at North Bay. Twenty-two water quality assessment studies were undertaken and 89 lake classification evaluations were completed. Nineteen groundwater quantity and quality investigations were undertaken. In total, 1,293 well records were verified and more than 100 contacts were made with well drillers and plumbers to upgrade their services to the public.

Utility Operations

The Region operated 49 sewage works and 23 water treatment plants during 1979-80. New water pollution control plants were placed in operation in Blind River and Thessalon; a new water treatment plant was made operational in Hearst. Two sewage works and one water works were returned to municipalities for operation in the year according to continuing government policy in this regard.

Staff completed safety audits at all projects and facilities during the year. In addition, training workshops and seminars were arranged for staff on defensive driving, confined space entry procedures, Ontario Health and Safety Acts and the care and use of self contained breathing apparatus. No fatalities or permanent injuries were suffered by any personnel in the Region during the year.

Central Region

*Director: C.J. Macfarlane

Significant activities included an air quality improvement program in the core area along Lake Ontario, the adoption of an improvement program for Lake Simcoe-Couchiching and the control of phosphorus inputs to waterways.

Of major importance in the year was the Mississauga derailment on November 10-11, 1979. Tank cars containing compressed gases, chlorine, styrene, toluene and caustic soda were damaged and their contents were released to the environment. All sections of the Region participated in providing on-site advisory support on environmental matters to the Region of Peel Emergency Measures Organization. After the damaged cars were emptied of their contents, direction was given to clean-up crews on the removal and disposal of contaminated soil and seepage waters. Contaminated seepage waters were hauled to the Clarkson sewage treatment plant and fed at a controlled rate through the plant. The disposal procedures were monitored to ensure that the environment was not adversely affected. The contaminated soils were disposed of at the new Britannia Road regional waste management site.

Industrial Abatement

Elevated lead levels were recorded around the Canada Metal Company Limited plant on Eastern Avenue in the City of Toronto. The Region successfully prosecuted the company and issued a very comprehensive Control Order to deal with the emissions from the plant. Additional baghouses were the major requirement of the Control Order. A consistent improvement had been noted at air monitoring stations in the area.

Investigations and surveillance of the sources, haulers and receivers of liquid industrial wastes intensified during the year. Legal action was initiated in some cases and was under consideration in other cases at year-end. The majority of agents involved with the disposal of liquid wastes are complying with the waybill system.

As a result of the Mississauga train derailment, the emergency spill response system in the Region was being reviewed at year-end with a view to establishing more formalized response procedures. The implementation of Bill 24, when its regulations are available, will be an integral part of the finalized spill response system.

Municipal and Private Abatement

Recreational lakes surveys were undertaken in the District of Muskoka on Nine Mile Lake and Lake

*C.J. Macfarlane has been appointed director of the Waste Management Branch, succeeded by D.P. Caplice, former director of the Ministry's Environmental Assessment Branch. Both appointments were effective in September 1980.

Muskoka; in the Provisional County of Haliburton on Esson, Kashagawigamog and Miskwabi Lakes; in Peterborough County on Mississauga and Catchacoma Lakes, Catchacoma Narrows and Beaver, McGinnis and Gold Lakes. A total of 1,941 cottages were inspected to ensure that sewage treatment facilities were adequate for the purpose of protecting the quality of the recreational waters. When malfunctioning or pollution systems were located, agreements were entered into with the owners for the installation of corrective works.

Emphasis was placed on upgrading waste management sites and the development of new sites where existing facilities were proving to be inadequate. Of major importance was the completion of a new regional site in the Region of Peel. A total of 1,476 inspections were made of operating sites during 1979-80 to ensure compliance with legislation.

A total of 2,023 inspections were made of water and sewage works to ensure compliance with provincial requirements. Sewage work inspectors were concerned in part with the control of phosphorus inputs to the water environment. The majority of the plants were able to meet the 1.0 mg/1 standard of the Canada-Ontario International Joint Commission Agreement. In the case of the Lake Simcoe-Couchiching Basin, a joint municipal-provincial committee recommended stringent phosphorus control programs on the basin. The Cabinet Committee on Resources Development proposed the adoption of an improved quality alternative for the two lakes whereby the phosphorus loading would be reduced from 105 to 87 tonnes per year.

Air Quality

The major improvements in Toronto's air quality achieved over the previous ten years were maintained during 1979. The sulphur dioxide level in 1979 was lower than the 1978 level and well below the annual criteria. Suspended particulate remains slightly above the annual criteria. The A.P.I. (Air Pollution Index) exceeded the maximum desirable level on only two occasions, but did not reach the first-alert level. Monitoring for hazardous substances was continued in 1979. The intensive lead monitoring program in the vicinity of five Toronto-area lead plants was maintained. Airborne asbestos was monitored at three asbestos-using plants in the Region.

During the year, 360 applications relating to air emissions were processed and approved. Evaluations involved analysis of combustion equipment, plant and process exhausts with or without control equipment. Particular attention was given to asbestos and heavy metal emissions and other potentially hazardous substances such as TDI, MDI, PVC and PCB.

Water Quality

Studies were carried out on a number of recreational lakes, either to assess their sensitivity to development, or to establish and maintain a data base for long-term water quality trends. Six lakes, (Salmon, Fortescue, White, Galloway, Greens and Picard) in Peterborough County were studied. In the District Municipality of Muskoka and the Provisional County of Haliburton, a co-operative MNR/MOE survey program

was undertaken to define the existing quality and assess the sensitivity of four lakes, Lower Fletcher, Pine, McFadden and Oxtongue, currently managed as lake trout waters. Studies were conducted to update the water quality information for Fairy and Peninsula Lakes in Muskoka and to determine their waste assimilative capabilities. The self-help program, whereby citizens collect water quality data for recreational lakes, was increased to 82 lakes. Generally, the quality of Precambrian lakes monitored under this program has remained reasonably constant.

Studies were undertaken on the receiving waters at ten sewage treatment plants to assess the impact of the discharges. The data will be used to determine how well the water quality objectives in the Ministry's new policy document are being met and to establish the need for additional work at other locations.

As a result of proposed urban development in a number of municipalities, stream assimilation studies were conducted to assess the impact on the receiving waters from discharges at the following sewage treatment facilities: the Stouffville plant, which discharges to West Duffin Creek; the Acton facility, which discharges to Black Creek; the Georgetown plant, which discharges to the West Branch of the Credit River; and the Havelock Sewage Lagoons, which discharge to Plato Creek. The data collected will be used to document stream quality and to establish allowable waste loadings for proposed expansion of these facilities.

Due to the increasing concerns relating to the impact of acid precipitation on waters in the Precambrian Shield area, a sampling program was initiated at eight locations on the Muskoka River system. The largest variations in pH and alkalinity values, due to the influx of acidic waters from the melting snow, occurred in the upstream areas of the system. Further downstream in the system, the dampening effect of large on-stream lakes was evident, as the variations in pH and alkalinity were greatly reduced. Regional staff sampled 51 Precambrian Shield lake trout lakes as part of the Acid Precipitation Study in Ontario. The data obtained from this survey will aid in determining the relative sensitivity of these lakes to acid precipitation.

The groundwater group of the Water Resources Assessment Unit investigated 32 complaints about individual well water quality problems. Many of these resulted from poor well construction and maintenance or high iron and/or bacterial content in the well waters. The group also investigated 28 complaints concerning lowered water tables allegedly caused by water withdrawals and excavations. Salt contamination problems were investigated in 11 communities, of which the most significant were Manchester (Township of Scugog) and Goodwood (Township of Uxbridge).

The hydrogeological setting of a number of proposed landfill sites and the monitoring results of existing sites were reviewed to determine the likely impact on local ground and surface water quality through the production, movement and attenuation of leachate. Sites assessed included Beare Road, Brock Road West and North (Metro Toronto sites); York Sanitation #1, #2 and #4 (Town of Whitechurch-

Stouffville); Nelson (Township of Otonabee, City of Peterborough); Township of Vespra.

Thirteen stream flow recording stations were maintained, while periodic measurements were made at 11 additional sites. Water quality samples were collected at 199 stations with the help of the Credit Valley, Halton Region, Metropolitan Toronto and Region and South Lake Simcoe conservation authorities. Radiological monitoring of surface and groundwaters in the Township of Cardiff and at the Eldorado Nuclear Facilities in Port Hope and Port Granby was continued. Thirty continuous recording observation wells were operated in the Region to monitor fluctuations in groundwater levels.

Environmental Planning

The environmental planning expertise of the Technical Support Section was frequently called upon to co-ordinate Ministry comments and determine the Ministry position on development proposals submitted under The Planning Act. As well, the planners within the Region increased liaison within the municipalities, wherever possible, to provide advice on the designation of land uses within municipal plans. Liaison with private developers and their consultants continued to introduce environmental factors at early stages of design.

Review of plans submitted under The Planning Act was increased, as was the review of documents and proposals submitted to fulfill the requirements of The Environmental Assessment Act.

Utility Operations

The Regional Utility Operations Section operated 17 sewage treatment plants and lagoons and nine water treatment plant and well facilities in 1979-80. These facilities serve approximately 500,000 population.

Operational responsibility for the major treatment facility of the York-Durham sewage system at Duffin Creek was transferred to the Region of Durham.

Negotiations were successfully complete whereby the Town of Midland assumed operational responsibility for its sewage works. The Town of Midland also assumed responsibility for the construction of additional works to convert the plant from simple primary to complete secondary treatment.

West-Central Region

Director: G.H. Mills

Industrial Abatement

Further progress in pollution control was made by the steel mills in Hamilton. The second stage of the east side filtration plant at Stelco was placed in operation. All finishing wastewaters are now being filtered to remove suspended solids and oil. Experimental collection hoods were installed in blast furnace No. 4 casthouse at Dofasco and in 'C' blast furnace casthouse at Stelco to collect fugitive emissions during casting. The effectiveness of these hoods was being assessed at year-end. Stelco was preparing for start-up of its new LED mill at Nanticoke. The most up-to-date pollution control facilities have been installed in this mill.

Ontario Hydro completed conversion of its Nanticoke Generating Station from burning only United States coal to burning a blend of equal amounts of United States and Western Canadian coals. One of the reasons for this conversion was to reduce sulphur dioxide emissions. The Sulphur content of Western Canadian coal is only about eight per cent of United States coal.

Efforts continued with a number of foundries in the Region to reduce or control emissions. Bibby Foundry Limited at Cambridge completed installation of filter equipment to control emissions from a cupola. The system includes adequate temperature elevation and residence time for gases to obtain proper incineration of hydrocarbons.

Elevated levels of metals in yard soil at the Manchester Public School, Cambridge, were the cause of considerable public concern. The elevated levels were due to long-term emissions from an adjacent brass foundry. Neither the Ministry nor staff of the Occupational Health Branch of the Ministry of Labour could establish a hazard and blood tests of the school children and teachers showed acceptable levels for metals. The school board eventually replaced the soil and re-sodded the yard. Ambient air monitoring also showed acceptable levels of metals.

The disposal of PCBs and other hazardous wastes continued to be a problem. The Canadian General Electric Company at Guelph was to provide a suitable PCB blend for a trial burn at St. Lawrence Cement in Mississauga. Since the burn was cancelled, a warehouse was constructed for PCB storage. A proposal for an interim storage facility for PCB wastes in Middleport, Brant County, met with much public resistance. A local citizen's group was organized to oppose the storage of these wastes in their municipality and a citizen's information committee was set up to keep area residents informed on all aspects of the development of the proposal.

The paper mills operating in the Niagara Region maintained abatement schedules as required by their respective Control Orders and Program Approvals. The Ontario Paper Company continued a major expansion and modernization project to be completed in 1982.

General Motors commenced construction on a major plant expansion.

Much public apprehension was evident concerning an approval granted to Frontenac Chemical Waste Services Limited to operate a waste oil and solvents fuel storage tank in Welland. The company did not proceed with the proposal.

An industrial waste solidification facility was proposed for the Walker Brothers Quarry site for which environmental hearings will be required.

Both Atlas Steels and Inco Limited proceeded on schedule with multi-million dollar liquid waste treatment facilities. Cyanamid (Welland Plant) also maintained the required abatement schedule.

Municipal and Private Abatement

A number of important expansions of existing water treatment and sewage treatment plants in the Region were completed during the year. These expansions will enable continued residential and industrial development in the larger cities of Waterloo Region and the City of Guelph. New water and sewage facilities were completed in the Village of Ayr. Sewage plant expansions were under way in Shelburne and Elora at year-end and were being planned for Elmira and New Hamburg. The communal sewage facility in the Police Village of St. George is to be completed in 1980-81.

The Dundas sewage treatment plant was expanded from 2.5 to 4 million gallons per day in late 1978. At year-end, Ministry staff were reviewing plant performance data and records to determine if all performance parameters for effluent quality were being met for discharge into Cootes Paradise. This was a subject of great public concern at the time of the hearings for this plant.

The Woodward Avenue plant in Hamilton was expanded from 60 to 90 million imperial gallons per day. One objective of the expansion was to improve the degree of phosphorus removal at the plant. At year-end, a consulting engineering firm was conducting a study to determine the new plant's treatment capabilities and set operating criteria to provide the most effective treatment.

In Niagara, the regional municipality was very active in undertaking many sewage and water construction projects, including the Smithville water softening facility, the Welland water treatment plant expansion and the Port Colborne sewage treatment plant. The sewer rehabilitation program in Port Colborne was initiated and was deemed successful. The City expects the program to continue. In Fort Erie, the Rosehill water treatment plant was virtually completed at year-end.

In waste management, efforts are continuing to close out small, inefficient sites and encourage the establishment of properly engineered and managed larger sites. Unfortunately, it is a lengthy arduous process to establish new sites today and municipalities are faced with the need to start planning for them many years before they will be needed.

Regional Hamilton-Wentworth has received a favorable decision regarding the Glanbrook Landfill site

from both the Ontario Municipal Board and the Environmental Assessment Board. The decisions were subject to a number of conditions that must be met by the Region prior to use of the site. At present, Ministry staff are reviewing the plans and other information submitted by the Region in their attempts to fulfill these conditions so that disposal operations may commence by September 1980.

Methane gas from the closed Ottawa Street Landfill site in Kitchener was discovered in basements of nearby new-housing units in 1976. Since that time, the Regional Municipality has installed forced venting systems and a gas burner. At year-end, the Municipality was looking at utilizing this gas as an energy source. In Niagara, due to the increasing difficulty in obtaining new landfill sites, the Regional Municipality was exploring the possibility of establishing a regional incinerator project to provide waste heat to a local industry.

The implementation phase of the Ministry's new sewage sludge utilization program was well under way in 1979-80 and no major problems were encountered. A lack of approved sites to dispose of the sewage sludge may pose future problems.

The value of the Grand River as a source of water supply was reinforced by commencement of an experimental artificial recharge project at Mannhiem, whereby river water will be pumped into abandoned gravel pits to recharge the groundwater supply. In addition, an infiltration gallery was constructed on the banks of the Grand River near Breslau to supply additional water to the City of Kitchener. To some degree, the success of these and similar projects may depend upon the outcome of any decision to construct the West Montrose Dam.

Air Quality

In Hamilton, after a significant improvement in air quality during the 1970-75 period, the trend levelled off, and, up to 1979, levels remained relatively stable. Except for occasional odour problems in the vicinity of heavy industry, the main problem continued to be airborne dust. Suspended particulate levels were still elevated well above objectives near the industrial area, although most of the City showed generally acceptable levels. One notable observation has been the lack of any improvement since 1970 in dustfall levels (re-entrainment by road traffic may be a factor).

During 1979, there were 22 instances in which the Air Pollution Index (API) in Hamilton reached or exceeded 32, all during inversions. In the few years prior, seven to ten such incidents took place, none of which matched the severity or duration of some of the 1979 occurrences. The API reached 50 for the first time since 1970. This apparent deterioration of air quality did not, however, represent any increase of industrial emissions; rather, it simply reflected increased instances of poor atmospheric dispersion. However, these events do indicate that the entire City is still very susceptible to periods of high pollutant levels, usually during Spring and Fall.

At Nanticoke, air quality generally remained well within acceptable levels, and, in 1979, the Nanticoke

Environmental Management Program (NEMP) completed its first full year of monitoring with a network of automated instruments.

Throughout the Region, ozone levels showed a marked decrease in excessive levels in 1979, probably due to a relatively cool Summer that was not conducive to oxidant formation. Other parameters generally remained unchanged and at acceptable levels, except for local problems in Ayr, Cambridge, Chippawa, Thorold and Welland, which must still come under control.

Two new API stations were established in Niagara Falls and St. Catharines in 1979; no incidents above the advisory level were recorded in either case.

Water Quality

The major portion of the West-Central Region is drained by the Grand River and its tributaries. The river is used for recreation, waste assimilation and water supply. The management of this entire watershed is of great importance, since the interaction of water uses can affect one another.

The involvement of staff with the Grand River Implementation Committee continued as in previous years. The major environmental assessment on water control structures in the Grand River, as commissioned by the Grand River Conservation Authority (GRCA), was reviewed by the West-Central Region. Staff undertook waste assimilation studies in the Grand River Basin at Wellesley, Baden and New Hamburg on the Nith River system, and Elora and Fergus on the Upper Grand River. Other watersheds—the Lynn River at Simcoe, Big Creek at Delhi and the Credit River at Orangeville—were assessed for waste assimilation capacities.

A major study of the Confederation Park area of Lake Ontario, regarding urban runoff and bacterial pollution, was completed. The monitoring of Cootes Paradise water quality subsequent to the Dundas Sewage Treatment plant being expanded was also continued. The study on Hamilton Harbour took on a new slant during 1979-80, with emphasis on urban runoff and other inputs to the Harbour and the effects these inputs are having on water quality.

Several major hearings were attended during the year, notably the Glanbrook Landfill site hearings for Hamilton-Wentworth, the hearing on the SCA chemical waste discharge to the Niagara River in New York State, as well as numerous OMB hearings to which staff were subpoenaed.

Environmental assessment reviews were carried out for other proposals such as the Haldimand-Norfolk Regional Sewage Scheme study, Class Environmental Assessments for other ministries, as well as routine evaluations requested by other sections. The routine surface water quality monitoring program was maintained. Several major groundwater interference programs and investigations were also carried out, the largest in the vicinity of the City of Port Colborne.

Utility Operations

The Utility Operations Section was responsible for

the operation of 30 municipal sewage treatment systems and five water treatment and supply systems. Included were five sewage collection systems and four water distribution systems. One new water system and one sewage system were commissioned for operation in Ayr.

Southeastern Region

Director: R.E. Moore

Industrial Abatement

The Industrial Abatement Section investigated 178 spills and 566 complaints, made 829 general inspections and assisted in the processing of 239 Certificates of Approval.

Installation of equipment and other modification or improvements made to plants include significant undertakings by C.I.P. (Hawkesbury), Courtaulds (Cornwall), Caldwell Linen Mills, Lake Ontario Cement (Picton), Canada Starch (Cardinal), Domtar Wood Preserves (Trenton), Black Diamond Cheese (Belleville), Dupont (Maitland), C.N.R. (Belleville), Ottawa Fibre Industries, Andrew Jergens (Perth), W.R. Barnes and Canada Veneers.

Nine Orders, Requirements and Directions, Reports and Prosecutions were carried out during the year.

Routine inspections took up the majority of time in field work, with emphasis on dust and noise from mineral industries such as quarries, crushing facilities and smelters. Considerable time was spent responding to spills and complaints, preparing for Environmental Appeal Board hearings and issuing Control Orders.

Abatement of a problem with the Cornwall sewage system was initiated with four industries that agreed to monitor and control discharges not in compliance with the sewer use bylaw. A persistent H₂S problem was identified and will be reduced.

Excessive BOD and suspended solids discharges, which have plagued the dairy industry, were under investigation at year-end, in addition to odour problems associated with whey.

Gasoline contamination of wells from leaking tanks in service stations continued to be a problem.

Municipal and Private Abatement

Resources were primarily expended in inspection and abatement activities associated with waste disposal sites and water works and in investigating complaints. Increased action with respect to waste disposal sites resulted in the closure of four sites and improvements to a number of others. It is expected that this concerted abatement effort will continue. Part 7 continues to be very manpower intensive in the Ottawa District.

The Private Services Funding (PSF) program (i.e. the Low Cost Alternative Program) demanded more

attention during the year and will become a major drain on resources in the near future. It is anticipated there will be more than 60 PSF projects in the Region in 1980-81. This program, along with the analysis of a number of well complaints, has highlighted the need for more rigorous control of well drilling activity within the Region. Accordingly, inspections and educational programs concerning well drilling will be given more emphasis in 1980-81.

Very few problems were encountered with pleasure boats, marinas and ice fishing activities. As a result, these inspection routines will be reduced in 1980-81 so that more manpower can be allotted to the PSF and well drilling programs.

There was a marked increase in the number of public inquiries for general information about pesticides. This growing awareness signals the need for citizen education. Bats and European earwigs are becoming a major concern and will require increased effort in the future.

Storm water management continued to be an important activity. In Cornwall, the storm water study was completed and an overall pollution control strategy process was initiated. A contract was awarded for phase one of the Rideau River Storm Water Management Study, which will include a review of existing data and a delineation of sampling programs. The report is expected in the Fall of 1981.

Air Quality

The Air Quality Assessment Group conducted several special sampling surveys to assess airborne arsenic hazards at Deloro and Kingston and fluoride emissions in Gloucester Township. The latter survey involved a measurement of gaseous and particulate fluoride in the vicinity of a clay brick manufacturing plant, both during plant shutdown and during full operation.

A semi-permanent total reduced sulphur (TRS) monitoring station was installed in an area of high complaints near a fine paper mill. The company involved absorbed the costs of securing the site and paid for telemetering the instantaneous TRS results to the plant control centre. The station allows for more effective abatement strategies to be employed by the plant operators.

All data from air monitoring stations in Ottawa and Cornwall are being telemetered to Toronto and the City of Cornwall is being provided, as requested, with an up-to-date monthly report on air quality.

Water Quality

The Region's lake trophic survey program continued with the sampling of 12 recreational lakes. Monitoring of lake trophic status was carried out on an additional 71 lakes through the Cottagers Self-Help Program. Intensive sampling of a further 25 lakes was undertaken in conjunction with the Acid Precipitation in Ontario Study. Water quality monitoring continued at 170 river monitoring stations.

Staff investigated 17 interference and 60 contamination complaints concerning water supply. Additionally,

73 waste disposal sites and 22 sand-salt piles were investigated for groundwater contamination and 46 municipal water supply and/or waste treatment facility expansion proposals were reviewed. Reports were prepared dealing with arsenic contamination in the Moira River, the Cottagers Self-Help Program for 71 lakes and the sensitivity of 52 lake trout lakes to nutrient inputs.

Environmental Planning

The Region handled 1,881 requests regarding official plans and amendments, zoning bylaws, environmental assessments, certificates of compliance, ODC/DREE applications, water and sewage works applications. There was a decline in all aspects of land use with the exception of zoning bylaws. However, the decline was more than offset by a significant increase in the number of approval applications processed and in services (such as population projections) provided to other sections.

Laboratory Operations

The Regional Laboratory in Kingston continued to increase the diversity of its analytical service, while reducing the total number of tests performed. More emphasis was placed on in-plant testing, with assistance provided to the water and sewage plants wishing to perform their own control tests.

New tests were added in support of the acid precipitation program. A coliform test specific for *E. Coli* was also introduced to better identify the source of waste inputs. Fluoride analysis capability was added to support work done by the Health Units in this Region and to support their quality assessment activities.

In the Microbiology Section, the number of samples examined increased slightly from the previous year, but the test load was reduced 7.5 per cent by more appropriate test selection. In chemistry, the test load was reduced 10 per cent due mainly to a reduction of activity in surface water assessments.

Utility Operations

The Ministry has been operating an arsenic removal plant at Deloro since April 1979 under a Ministerial Section 99 Order to prevent degradation of the Moira River system. The plant is located on the site of the abandoned smelter owned by Erickson Construction Limited (formerly Deloro Smelting and Refinery Company Limited), which declared it could not operate the treatment facility for lack of sufficient funds.

The plant was found to be in extremely poor condition. It was concluded that the Ministry's objective for the arsenic in the Moira system could not be obtained without upgrading the plant and repairing leaks in the site drainage collection system. Additional steps to improve chemical addition, flocculation and settling, and lab control were also instituted. The arsenic sludge was thoroughly cleaned out of the ponds and transferred to a protected holding site. In September 1979, a writ was served on the company to recover the costs incurred by the Ministry in operating the treatment plant. The Courts ruled in favor of the Ministry in March 1980.

Meetings with municipalities to discuss transfer of operating responsibilities for Ministry water and sewage projects remained notably unsuccessful.

The new Killaloe Station WPCP went into service in late 1979, thereby providing treatment for the Village and eliminating the source of residential-well contamination in the Village.

Southwestern Region

Director: D.A. McTavish

Industrial Abatement

The Southwestern Region experienced about 30 incidents of liquid manure contamination of streams, resulting from spills or unsatisfactory operating procedures at intensive livestock farms. Many of the spills resulted in extremely serious fish-kills, including a virtual wipe-out of all aquatic organisms in the streams. An extensive informational program was carried on through the following Winter to ensure that farmers throughout the Region were made aware of the seriousness of the situation, the lethal character of liquid manure, and the measures necessary to avoid future manure spills.

BASF Wyandotte, a chemical company operating in Michigan, is using Fighting Island in the Detroit River for the disposal of solid waste resulting from their processes. As a result of the identification of elevated levels of chlorinated organic compounds in the eggs of herring gulls found on Fighting Island, the Michigan Department of Natural Resources and the Canada Wildlife Service expressed concern that these waste-settling beds might be a source of persistent organic compounds. The MOE has undertaken an extensive sampling program to determine if significant organic materials are deposited on the Island. Thus far, no unusual concentrations of compounds of concern have been found in the solids deposited on the Island, in the effluent discharged from the Island, or in the sediments of the Detroit River in the environs of the Island.

Regional staff have assigned responsibilities in the event of a release of radioactive material from the Bruce Nuclear Power Development, which has a potential to cause off-site effects. A comprehensive training program was conducted to familiarize the field-response teams with site facilities, the surrounding terrain and appropriate sampling techniques. Subsequently, the Region participated in an exercise designed to evaluate the effectiveness of the provincial contingency plan for nuclear accidents.

In accordance with the Memorandum of Understanding exchanged between Governor Milliken and Premier Davis, the Ontario Ministry of the Environment collaborates with the Air Pollution Control Divisions of the Michigan Department of Natural Resources and the Wayne County Department of Public Health to integrate

several aspects of air pollution control programs in their respective jurisdictions along the boundary area from the head of the St. Clair River to the mouth of the Detroit River. A study was undertaken to identify sources of potentially toxic gases that could be released in the event of an accident or spill and have transboundary significance in terms of risk to the exposed public. Steps were taken to ensure that contingency plans of the sources involved included a commitment to immediately notify the police in the neighboring jurisdiction in the likelihood of toxic gases being transported across the international boundary.

A rural site in Moore Township was used in the late 1950s for the disposal of sludge-like material from industries in the Sarnia area. When use of the site was discontinued, the site was not satisfactorily covered to ensure containment of wastes. Upon MOE investigation the present owner was ordered to correct the situation. At year-end, some of the specific requirements set out in the Order were under appeal by the owner.

Municipal and Private Abatement

Effective April 1, 1979, the Ministry of the Environment accepted full responsibility for the private sewage program in Lambton County, subsequent to a decision by the Lambton Health Unit to terminate its agreement with the Crown. During 1979-80, 300 sewage system applications were received and processed. Certificates of Approval were granted in all but ten instances. No appeals were filed with the Environmental Appeal Board respecting the ten applications for which approval was denied. Also, as part of this program, 239 severance applications involving 473 parcels of land were inspected, and written reports were submitted either to the Lambton Land Division Committee or to the appropriate local Committee of Adjustment.

Due to widespread public concern Ministry staff undertook the creation of guidelines to be applied throughout Lambton County for the installation of septic systems. Lambton County is a difficult area in which to place septic tanks. The soil generally displays very low porosity and innovative design is required. Overall, the public was extremely co-operative in dealing with Ministry staff and the lack of appeals would appear to indicate that most public concerns were being satisfactorily addressed.

As a result of extensive water quality sampling and a hydrogeological investigation, it was determined that one of Ingersoll's municipal wells was probably being contaminated by a nearby industry. The well water contained high levels of fertilizer products similar to the types being manufactured or mixed at the local industry, which agreed to replace the municipal well entirely at its own cost. The municipality agreed to deed the existing contaminated well back to the industry.

During the Summer of 1979, City of London municipal employees went out on strike. This strike resulted in a termination of all municipal services, including the collection of garbage and the operation of the sewage treatment plants. The City had, in consultation with the Ministry of the Environment and the local Medical Officer of Health, requested assistance

in the establishment of temporary landfill areas throughout the City. These landfill sites or temporary storage areas were used by residents until the strike was over and a complete clean-up was effected. The sewage treatment plants were effectively run by management staff of the City. Stepped-up monitoring of the sewage treatment plant effluents by Ministry staff revealed that no deterioration of the effluent took place. However, severe odour problems were created in the vicinity of the Greenway sewage treatment plant because management staff were unable to operate the sludge incinerators. As a result, sludge cake had to be stored in the open air within the sewage treatment plant property, which resulted in noxious odours being produced over a large area of the City. The odour persisted for some weeks after the strike, while the sludge was being cleared.

The Ministry-owned and-operated sewage treatment plant serving the Town of St. Mary's has been severely organically overloaded (principally by food processing wastes) since July 1979. Improved housekeeping by local industries did not totally reduce the loading to acceptable levels. Consequently, the Town of St. Mary's hired a consulting engineering firm to study the problem in detail and recommend remedial measures. A new industrial waste bylaw was prepared to better control the industrial loading, and the consultant recommended expansion of the sewage treatment facilities. It is hoped that in 1980-81 this problem can be resolved with none of the industries leaving St. Mary's and the Town of St. Mary's not being forced to accept an undue cost burden in order to treat industrial wastes.

The Township of Collingwood is used extensively for recreation by residents throughout Southern Ontario. As a result, there has been considerable pressure for development in the area and the Ministry has undertaken to assist the municipality with its Up-Front Grant system in the establishment of both water and sewage service systems.

During 1979-80, extensive discussions were held with 1) a consulting firm charged with the design of the system, 2) developers in the area, 3) the Town of Collingwood, and 4) the Township of Collingwood in order to outline the grants available and attempt to have the works undertaken as quickly as possible. Full agreement on all matters had not been reached by year-end, but Ministry staff had completed sufficient reviews to determine the best means of servicing the area to minimize any environmental impact. These projects are to be undertaken in the near future.

In April 1976, the Ministry recommended that the Derby landfill site be closed out as soon as possible (the site was contaminating area groundwater supplies). Since then, the City of Owen Sound has been seeking approval of a new site on North Half Lot 28 and Lot 27, Concession B, Sydenham Township. Approval was still pending at year-end. The City monitored water quality in neighboring water wells at the Derby site; no further quality deterioration was observed. However, the extent and direction of the contamination plume is not known and must be established to ensure proper closure and long-term protection of the surrounding aquifers.

Detailed investigations are to be undertaken during 1980 by the City's consulting hydrogeologist to provide recommendations on site closure and plume containment.

Air Quality

During 1979-80, the **Air Quality Assessment Unit** maintained 75 monitoring sites collecting pollutants over 30-day periods, 66 instruments collecting total suspended particulates for 24-hour or 72-hour periods and 73 continuous air monitoring instruments. The goal of achieving 90 per cent valid data was surpassed, based on the collection of close to 600,000 measurements. These data were used to prepare formal reports on air quality for Windsor and Sarnia and a report covering the Michigan-Ontario transboundary air pollution area. The Ontario Air Pollution Index was provided for Windsor and Sarnia.

Continuous monitoring for radioactivity in total suspended particulates was expanded in the vicinity of the Bruce Nuclear Power Development site. Background monitoring for radioactivity was initiated in southwest Essex County, which is close to a nuclear generating plant in Michigan. A special study to determine the impact of particulates in the Beachville area was continued and a formal report was issued. More intensive sampling was conducted for particulates in the vicinity of the St. Mary's Cement Company, St. Mary's.

Appreciable improvements were made in respect to instrument performance and safety.

Water Quality

The **Water Resources Assessment Unit** completed 28 reports of memoranda outlining water quality assessments for establishing waste control requirements for surface waters throughout the Region. Major reports included a biological documentation of the St. Clair River; watershed studies of the Avon River, Bayfield River and Lucknow River; and sewage effluent plume studies in London and Walkerton. Fifteen surveys were conducted on rivers or lakes, including a major benthic study of the western basin of Lake Erie. Specialized efforts included sampling for PCBs in the Detroit River (Fighting Island), at the Meaford landfill site and in Pottersburg Creek (London); sampling for mirex and PCBs in Kettle Creek; and assistance to the Water Resources Branch in aquatic plant studies on the Mary Ward Shoals (Georgian Bay). The water quality monitoring network was sustained, based upon the collection of monthly samples at 130 stations. Surveillance of approximately 30 recreational lakes in Grey and Bruce Counties was also maintained. Continuous records for dissolved oxygen and temperature were obtained at seven stations and streamflow measurements were taken regularly at 25 stations during Summer and Fall.

Staff investigated more than 30 fish kills and assessed two surface water flow interference complaints.

Construction of an experimental marsh treatment facility at Listowel commenced, with an anticipated completion date of July 1980.

The Avon River report precipitated the Stratford-Avon Environmental Master Plan study, which will encompass two years of intensive sampling and demonstration projects to establish the most cost-effective approaches for meeting water quality objectives in the Avon River.

Water Resources staff were involved with numerous other complaint investigations, reviews of marine construction proposals, official plans and amendments, subdivision proposals, Permits To Take Water, pump tests and various development proposals. Effluent requirements for Certificates of Approval for several new sewage facilities were defined and forwarded to the Pollution Control Branch.

Seventy-nine complaints of well water supply contamination were investigated and evaluations of 34 groundwater quantity interference complaints were made. Many complaints involved extensive field investigation and long-term monitoring. Reports and correspondence were forwarded to all complainants and, in some cases, to MPPs and to the Ontario Ombudsman.

Assistance was provided to the Municipal and Private Abatement Section in the evaluation of the groundwater impacts of numerous developments and waste disposal sites, including 45 subdivisions, 21 aquifer tests, 29 sanitary landfill sites and eight sewage treatment and disposal operations.

Comments were provided to Approvals and Planning on the potential groundwater implications of approximately 120 official plan amendments, 25 environmental assessments, 28 Permits to Take Water and 24 pits and quarries applications.

Operation and maintenance of automatic recorders on 33 observation wells continued in order to assess groundwater level fluctuations. In addition, manual measurements were taken in some ten other wells to monitor conditions at specific sites.

Under the Water Well Program, staff inspected 2,439 wells and pump connections (where present) and reviewed and corrected an equivalent number of water well records. Water well locations were plotted on permanent maps. The reduced number of defects (24 per cent) indicates the significant progress being made with this program.

General information, primarily from water well records, was provided in response to 400 inquiries.

Approvals and Planning

The **Approvals and Planning Unit** co-ordinated and provided regional input to the review of 158 plans, amendments and zoning orders circulated by the Ministry of Housing and forwarded written responses on all submissions and follow-up correspondence. The Unit performed a similar function with respect to 60 development proposals circulated by municipal planning departments and six applications received from the Niagara Escarpment Commission. In addition, the Unit prescreened numerous municipal zoning bylaws for servicing and/or environmental implications prior to circulation to the appropriate district offices.

The Unit co-ordinated and provided technical

support input to the Region's response on 19 reports relating to sewerage and water supply distribution systems. Nineteen applications were processed for Certificates of Approval ensuring compliance with air quality requirements and 233 permits were issued for water takings.

The Unit co-ordinated the Region's review and forwarded comments on 70 submissions circulated by the Ministry of Natural Resources under the Pits and Quarries Control Act and the Lakes and Rivers Improvement Act. Regional input was provided on 27 undertakings falling within the category of environmental assessments, ten of which were formal.

The Unit provided input on the water quality implications of fish hatchery operations, the Lambton County Official Plan, the review of conservation authority watershed plans, the updating of four sections of the land use planning handbook, the implications of new planning legislation. The Unit completed preparations for a plan review workshop for district office staff.

Laboratory Services

The London Regional Laboratory performed 166,382 chemistry tests on 17,205 samples and 43,416 microbiological tests on 16,011 samples.

Assistance was provided to several pollution control plants to resolve sludge bulking and actinomycete-foaming problems.

A program designed to assess salmonella discharges from red meat and poultry industries was completed. The efficiency of destroying this pathogen by activated sludge treatment and disinfection was also evaluated.

An improved method of fecal coliform recovery by substituting m-Tek Agar instead of MacConkey was instituted.

The weighing and calculating associated with "Solids" analysis was automated by combining a Radio Shack TRS-80 micro-computer with a mettler HL52 balance.

Utility Operations

One tertiary sewage treatment plant and two sewage lagoon facilities (with collection systems) and two well and water distribution mains projects were completed in 1979-80. A further eight projects were under construction at year-end.

Responsibility for the Chatham Water Pollution Control Plant, with a staff of 12, was transferred to the City Council. Contact was maintained with municipalities capable of operating the projects serving them. Efforts to effect further transfers from the Province to the municipalities were not successful. The municipal councils are satisfied with the operational expertise available from the Ministry and realize that they have effective cost control through the annual budget approval and rate review processes at the local provincial-municipal liaison committee level.

Ministry-owned and-operated water treatment plants and pipelines and sewage treatment plants provide service to 123 municipalities in the Region.

Laboratory Services Branch

Director: G.C. Ronan

The Laboratory Services Branch provides the analytical support that serves as a basis for the Ministry's pollution abatement and environmental quality assessment programs. In 1979-80, the continuing interest in the environmental and possible health effects of toxic organics resulted in increased demands on the laboratory's organic analytical capabilities. There were concomitant minor reductions in the requirements for inorganic, microbiological and pesticides analyses, thus continuing the trend towards a more selective approach to the consumption of analytical resources.

The Laboratory User's Committee continued to act as a regulator on the analytical requirements of the diverse sampling programs carried out by abatement and assessment groups, and regional and management program chiefs voluntarily cut back or held their analytical requirements to the level of the previous year.

Branch Organization

The Branch underwent a major organizational change during 1979-80. The four main units of the Physical Methods Section, which had been formed in 1976, were separated and integrated into other sections within the Branch.

The X-ray Unit and the Complaint Analysis Unit were integrated into the Air Quality Section, which was renamed the Inorganic Trace Contaminants Section. The Radioactivity Unit and the Electron Microscopy Unit were merged with the Water Quality Section. (For the purposes of this report, the workload performed by these integrated groups is presented as if the Physical Methods Section was extant.)

As a result of the re-organization, the Branch consisted of six sections at year-end:

1. The Water Quality Section provides routine water and wastewater quality testing.
2. The Inorganic Trace Contaminants Section conducts elemental and inorganic analysis on air, water and biological samples.
3. The Pesticides Section provides routine and non-routine pesticides and other organic analysis on all types of environmental samples.
4. The Organic Trace Contaminants Section conducts routine and complex organic analysis on water, air and biological samples.
5. The Microbiology Section determines bacterial levels in waters and wastewaters, identifies microorganisms and conducts microbiological assessment of the mutagenicity of pollutants.
6. The Administrative Section provides personnel, finance and general administration; operates the Laboratory and Research Complex safety program; and administers the Central Stores for the Ministry.

Three regional laboratories in Thunder Bay, Kingston and London perform general chemical and microbiological analyses in support of regional programs in the Northwestern, Southeastern and Southwestern regions respectively.

Tests Performed

The Toronto and regional laboratories performed 1,590,000 tests during 1979-80, a total within 7 per cent of the 1978-79 workload. The Toronto laboratories conducted over 1.1 million tests or 72.5 per cent of the total test load. The regional laboratories increased their share of the workload over 1978-79. The Thunder Bay laboratory conducted 6.5 per cent of total testing; the Kingston laboratory, 8 per cent; the London laboratory, 13 per cent. Table 1 provides a comparison of test production by the various laboratory sections and regions during 1979-80 and 1978-79.

Programs and Laboratory Clients

Nearly 65 per cent of the tests performed in the Toronto laboratories were in support of regional activities. Diagram 1 (appendices) compares relative test inputs from the various clients for the combined regional/Toronto laboratories.

Non-regional, or head office, programs accounted for about 35 per cent of the total chemical workload. Of these, the Air Resources Branch took up 2 per cent of the laboratory's resources; the Pollution Control Branch, 2.5 per cent, and Water Resources Branch, 24 per cent. Non-MOE programs, supporting MNR, MOE and various conservation and federal programs, accounted for 5 per cent of the laboratory's workload.

Numerous regional programs require analytical support. Some programs, such as phytotoxicological studies or air assessment programs, are accounted for within the region; others, such as routine river monitoring, are accounted for within the co-ordinating head office branch. For this reason, the Water Resources Branch appears to use a disproportionately large portion of the laboratory's capability.

The principal programs resulting in major laboratory requirements are: air and water assessment, sewage and waterworks monitoring and river monitoring (see page 60 appendices).

Diagram II (appendices) lists the significant MOE programs that require laboratory support.

Analytical Surveys

The principal analytical load this year, as in the past, was from routine programs required for the monitoring of water and air quality. The largest was the workload generated in support of the monitoring of sewage treatment and drinking water treatment facilities. Together, these programs accounted for over 400,000 tests which were used to monitor the efficacy of water and sewage treatment systems (both provincially and municipally operated). Water and air assessment programs each required about 100,000 tests. The water assessment program consisted mainly of stream and river sample analyses for routine chemical and metal parameters. The air assessment program was made up

TABLE 1:
TESTS PERFORMED: LABORATORY SECTIONS, 1979-80

LABORATORY	1979-80 Tests x 1000	% of Total 1979-80	1979-80 Tests x 1000	% Change 1979-80 vs 1978-79
Water Quality	648	41	678	-4.6
Inorganic Trace Contaminants	277	17.5	284	-2.5
Organic Trace Contaminants	52	3.5	48	+7.7
Pesticides	8	0.5	8.4	-6.3
Physical Methods	23	1.5	29	-26
Microbiology	136	8.5	140	-2.9
Total Toronto Laboratory	1,144	72.5	1,187	-3.8
London	210	13	192	+8.6
Thunder Bay	106	6.5	104	+1.9
Kingston	130	8	143	-10
Total Regional Laboratories	446	27.5	439	+1.6
Total Laboratory Services Branch	1,590		1,626	-2.3

mostly of high-volume filters requiring total suspended particulate loadings and associated metal/anion content. Some of the other large, ongoing surveys were the Great Lakes study, lakeshore capacity, industrial abatement and technical support surveys.

The high demand for the analysis of all types of environmental samples for hazardous materials continued. The increasing emphasis on toxic organic compounds was illustrated by two major surveys. In one survey, water samples from the Niagara River and drinking waters from the same general area were analyzed in response to findings of organic contamination in the Love Canal area and discharges from industrial treatment on the U.S. side of the river. No chlorinated dibenzodioxins or its precursor, 2,4,5-trichlorophenol, were found.

In the other survey, trace organics testing was used to help solve a mysterious taste and odour problem in the South Peel water distribution system. It was shown that epoxy resin used to repair the reservoir walls contained phenol, which was being leached out and chlorinated by residual chlorine in the finished water.

The Mississauga derailment required identification of inorganic and organic by-products during the emergency itself and in support of clean-up operations.

The use of fish as an indicator of water pollution

continued but at a reduced rate. About 10,000 fish were analyzed for mercury; 2,700 for PCBs. This year's guide book, "Guide to Eating Ontario Sport Fish", was based on over 60,000 fish analyses.

The Sudbury Environmental Study moved into its final year and resulted in a major increase in test loadings in the laboratory. Stack and in-plume samples, a variety of air particulate filter surveys, and acid precipitation samples were analyzed for metals, nutrients and anions. The precipitation analyses became a part of the Acid Precipitation in Ontario Study (APIOS) which also requires the analysis of waters, fish and biota from acid-stressed lakes, as well as terrestrial vegetation and soil.

The Sludge Utilization Program was initiated in 1979-80. The program required the analysis of 11 metals and a number of anions on sludges being used as a soil additive.

Increased demand continued for analysis of landfill materials and sites. Lysimeter studies, leachate analyses, litigation samples and head gas required organic and inorganic testing.

Public complaint samples, or samples requiring identification of major or toxic components, increased in number.

For example:

- a deposition of black powder on offices in the Hamilton area was found to be carbon;
- a determination of methyl alcohol was made in the drinking water of a public school;
- a massive fish kill in the Ganaraska River was traced to polyurethane waste spill;
- the spotting of aluminum siding was investigated in an industrial area;
- a white material coating automobiles was noted at numerous locations and its source was traced to insect droppings;
- Sault Ste. Marie drinking water was analyzed for round worms.

Investigative Developments

The Pesticides Section built and commissioned a dioxin laboratory, for the determination of this highly toxic, persistent chemical in a number of environmental matrices. The dioxin laboratory relies on a high sensitivity GC-Mass Spectrometer and capillary column gas chromatography, as well as sophisticated, efficient clean-up and separation techniques.

Other developments in Pesticides included:

- development of a method for analysis of human adipose and serum samples for PCBs;
- continued analytical support of studies at the Dowling PCB spill site;
- identification and measurement of a broad range of industrial organics in effluents and sediment cores originating from industrial discharge to Fighting Island in the Detroit River;
- provision of analytical support to the Air Resources Branch for PCBs in stack gases and ambient air;
- development of instrumental and group separation techniques for high performance liquid chromatography.

The Microbiology Section continued its development of the Virology laboratory and Mutagen/Carcinogen testing. In the latter area, the Ames test was modified for use in testing the mutagenicity of volatile organic compounds concentrated from industrial effluents. In the Virology laboratory, methods were developed for the isolation of viruses from a variety of environmental samples, including waters, sewage effluents and sediments. A joint epidemiological study with University of Toronto was initiated.

Numerous special studies were carried out by Microbiology. Pollution-indicating bacteria were determined in surveys of Humber Bay, Hamilton Harbour and Confederation Park (Hamilton).

Other studies included:

- a study of several media types for 35°C plate count;
- development of a single-step procedure for fecal coliform enumeration;
- evaluation of the Microtox Toxicity Analyzer system;
- development of the Rosenkrantz test, a bacterial system for the detection of DNA damage.

The Water Quality Section was involved in a number of field studies where analytical expertise was applied to on-site data acquisition for a variety of parameters, including residual chlorine and ammonia. Analysis of asbestos in air and water continued as a high priority activity. The Provincial survey of asbestos in drinking water resulted in the analysis of over 200 waters this year. Liquid scintillation continued to provide Limnology and Toxicology with lake productivity data based on C¹⁴ and P³² analysis.

Development work in the Water Quality Section was also at a high level during the year. Methods were developed for:

- tritium in drinking water;
- a new hot-block digestion for total nutrients;
- inflection point alkalinity;
- ammonia in anaerobic sludges.

In the Inorganic Trace Contaminants Section, lead, zinc and copper were each determined more than 20,000 times; cadmium, mercury, iron and nickel, each more than 15,000 times. This workload was expedited by reorganizing the Section and bringing two high-capacity instrumental techniques on-line. The multi-element techniques of automated atomic absorption spectrophotometry (AAS) and emission spectrometry (ES) permitted major improvements in analytical turnaround time and in the laboratory's capacity to determine metals.

At year-end, the inductively coupled plasma ES technique was being employed for the routine analysis of up to 12 elements on high-volume filters, sewage and sludge digests and acid precipitation samples. After similar preparation and instrumental development, waters, trade wastes and effluents were also being routinely analyzed with the computer controlled AAS system.

Other developments in the Inorganic Trace Contaminants Section included:

- speciation of arsenic compounds (As³ and As⁵), organolead compounds and various forms of cyanide;
- development of COH tape analysis for lead and iron;
- determination of metals in macrophytes and filamentous algae;
- simultaneous determination of several metals in dustfall samples.

In the Organic Trace Contaminants Section, there was a major equipment addition that added to the laboratory's diagnostic capability. A new Mass Spectrometer was brought on-line; its high sensitivity and superior library-searching capability resulted in a five-fold increase in the average number of identifications made on each complex GC/MS run.

Shipping and Stores

This year nearly \$700,000 worth of chemicals and glassware were issued. Stores inventory levels remained at the 1,300-stock-item level, and 800,000 bottles and tubes were processed in the bottlewashing and sterilization area. Over one-half million items, consisting mainly of samples en route to the various analytical sections, were handled by shipping and receiving personnel.

The shipping and stores area was renovated to accommodate the Laboratory Information System. The System will provide detailed analytical and sampling data to laboratory clients and will facilitate the Branch's record-keeping in terms of data log-in, bench production data and quality control functions. In 1979-80, the functional specifications were delineated, tenders called, bids selected and by year-end, acceptance tests had been drawn up.

Other Activities

Quality control continued to be an important factor in all Branch operations. An estimated 80,000 additional tests were performed as part of a daily effort to validate and control analytical data being reported to clients. Numerous round-robins were initiated, or participated in, by branch staff; many standard reference materials were created or tested; inter-laboratory checks were performed as part of a continuous effort to systematize and maintain data quality control.

Laboratory personnel chaired and participated in numerous technical committees as Ministry representatives or as scientific resource staff. During 1979-80, staff prepared over 120 reports. Of these, 16 were presented at symposia or conferences; 11 were released as official MOE publications; nine were published in technical journals; the remainder were made available as technical reports.

The laboratory newsletter, *Analysis*, continued to provide information on Branch developments and projects and readership interest continued to grow. By year-end, circulation had risen to 700 copies per issue and copies were being mailed to all provinces and to ten countries in North America, Europe and Africa.

A symposium on progress in environmental analysis was held at the Laboratory. Twelve papers on all aspects of environmental analysis were presented by laboratory staff to an audience of government and university scientific staff.

finance and administration division

Executive Director: G.E. Higham

This Division provides a complete range of support services and control functions to the operating Divisions required for the efficient operation of the Ministry.

Financial and Administrative Services Branch

Director: W.D. Wood

Accounts Payable

The Accounts Payable Section processes for payment all supplier accounts, grants, subsidies and employee travel expense claims. In 1979-80, 116,900 lines of input were processed for budgetary expenditures amounting to \$83.2 million and disbursements and charges amounting to \$139.5 million.

During the year, the payment system was automated to integrate cheque production with the financial reporting system.

Financial Reporting and Control Services

The Financial Reporting and Control Services Section is responsible for maintaining and improving a comprehensive financial information system for the Ministry. This Section is also responsible for the financial and budgetary control functions for all Ministry revenues and expenditures as well as cashiering and cheque distribution services.

Several major enhancements to the existing financial information systems will result in more up-to-date and detailed information for the benefit of line management of the Ministry.

COBIS Support Group

Towards the end of the year, arrangements were made to transfer the Common Object Business Information System (COBIS) Support Group from the Ministry of Treasury and Economics to the Ministry of the Environment. The COBIS Support Group provides system analysis and computer programming services for the maintenance and development of COBIS, which is a financial information system used by nine ministries and agencies of the Ontario Government, including this Ministry.

Purchasing

During the year, 9,782 requisitions were received

and 9,136 purchase orders processed for a total value of \$28.7 million.

Office Services

The Office Services Section maintains services to the Ministry in the following areas: the allocation of accommodation and parking, the procurement of printing, records and forms management, mail and messenger services, stockroom functions, the Policy and Procedures Manual, insurance liaison and telecommunications services. The Section also administers the photocopier control program established by Management Board in August 1977 which has resulted in savings estimated at \$35,000 per year.

Systems Operations

The Systems Operations Section operates various Ministry computer systems and provides key entry facilities, data base administration, "on demand" information retrieval programming, Remote Job Entry (RJE) and security services.

In 1979-80, new responsibilities included the Liquid Wastes Waybill System and the expanded Capital Monitoring System. In the same period, the computer data security system, Resource Access Control Facility (RACF), was implemented.

Capital Financing

Manager: C.D. Mialkowski

Significant activities include the financial management of the Province's investment in water and sewage works facilities, cost sharing agreements and grant programs.

Water and Sewage Works

Financial management was provided for 750 projects under agreements with municipalities and industry. The schedule below provides an analysis of financing under 500 Term Loan Agreements and also for 250 Provincially owned works under Service Agreements. In most cases, the water and sewage plants were

Investment in Water and Sewage Works
as at March 31

	1980	1979
	(\$ Millions)	
Term Loan Agreements		
Water Works	36.1	36.8
Sewage Works	58.2	58.7
Service Agreements		
Water Works	298.5	281.6
Sewage Works	668.9	598.2
Total Investment*	1,061.7	975.3

*at cost less recoveries

also operated by the Ministry. The statutory and contractual activities in this area include the accounting and reporting aspects, conducting 115 water and sewage rate reviews (90 in 1978-79), assisting municipalities in implementing billing and collecting systems and bylaw reviews. The Gross Revenue generated by these activities amounted to \$74 million in 1979-80 (\$72 million in 1978-79).

Cost Sharing Agreements and Grants

Administration of claims under the Canada/Ontario cost sharing agreements resulted in reimbursement of expenditures of \$890,000 (\$783,000 in 1978-79).

Loans from the Canada Mortgage and Housing Corporation amounted to \$42 million (\$63 million in 1978-79).

Provincial Assistance on projects under Service Agreements amounted to \$31.7 million (\$43.7 million in 1978-79). Direct grants to municipalities amounted to \$42.2 million (\$27.5 million in 1978-79).

Systems Development

Manager: G. Scanlon

In 1979-80, the Systems Development Section worked on a wide variety of projects with Ministry Branches and Regions.

The utility rate information system was expanded to include additional reports and optimized to improve operating efficiencies.

The development of the hazardous contaminants inventory system for the building of the hazardous substances cross-reference file and the creation of the industry description and contaminants inventory files was completed. A limited amount of data was entered and processed in the system for de-bugging purposes. In 1980-81, the building of the files will continue, while the development of the generalized reporting Module will be undertaken.

The data acquisition and processing system (DAPS) was put into operation for the Nanticoke environmental management program. The system includes monitoring equipment in the field and the central computer in the Air Resources Branch. Additional SO₂ monitoring stations will be added in 1980-81. The model located in the central computer was also made operational. In 1980-81, adjustments will be made to perfect the predictive capabilities of the model for research purposes.

Modifications to the Grand River simulation model were completed to provide agreement between the model and field results in the calibration and verification runs. In 1980-81, long-term simulation runs will be conducted.

Development of the basic reporting aspect of the utility performance monitoring system, for both imperial and metric units, was nearing completion at year-end. Data for 1978 and 1979 was being entered into the system for editing and correction purposes. In 1980-81, the system will be expanded to include municipally operated plants in addition to Ministry-operated plants and performance criteria for planning purposes.

Development of the laboratory information system was nearing completion at year-end. Testing sessions were scheduled for early 1980-81.

With regard to regional data processing needs, a manual pollution abatement enforcement system was implemented, while work continued on the automation of the regional water quality surveys. In 1980-81, a regional data processing strategy will be developed covering both equipment and software development in order to minimize duplication and to take greater advantage of software development occurring at head office and in the regions.

Development of the industrial liquid waste waybill system continued. Waybills were being entered into both the Wang System and the computer system at year-end. Now available from the system are head office/regional reports and management reports detailing and summarizing waybill activity by source of waste, carrier, waste sites and types of wastes. In 1980-81, an intelligent terminal will be acquired for the entering and editing of waybills.

A committee of representatives from regional and head office branches was formed to develop the waste site information system. Design of the system was completed, while development of the waste site inventory portion of the system was under way at year-end.

Internal Audit Branch

Director: E.F. Heath

The Internal Audit Branch is a central support function responsible for providing management with objective assessments of the financial and internal controls under which Ministry programs and activities operate. The major audit responsibilities are as follows:

- to identify and evaluate the adequacy of financial and administrative control aspects of Ministry operations;
- to review the adequacy and reliability of financial data and reports used by management for payment and other decision-making purposes;
- to determine the accuracy of claims from outside agencies and municipalities in respect of grants and transfer payments;
- to assist management by performing an independent review of any area of special concern;
- to communicate findings, suggestions and recommendations in a manner which will encourage and support corrective and/or constructive actions by the managers within the Ministry in accordance with their responsibilities and authority.

During the fiscal year the Branch continued its multi-year program of conducting operational and financial audits in the Ministry offices and plants throughout the Province.

In addition, this Branch conducted a review of grant payments under the Up-Front or Direct Grant Program with a total expenditure of \$33.7 million for the fiscal year. These grants provide financial assistance to municipalities and agencies towards over 170 sanitary and water system projects throughout the Province.

Information Services Branch

Director: R.J. Frewin

The activities of the Information Services Branch closely reflect current ongoing programs and new initiatives pursued by the Ministry.

The Branch continued to provide a full range of communications and public information services aimed at keeping the public informed of the Ministry's policies and activities. During the year the Branch produced and distributed 116 news releases, 25 statements and speeches, and a wide range of publications, reports, newsletters and both printed and audio-visual educational materials.

Publications

Cottage Country, an environmental manual for the cottager, was produced in co-operation with the Federation of Ontario Cottagers' Associations to provide a comprehensive guide to assist cottagers to preserve and protect the vacation environment. Through Federation and Ministry outlets, including regional cottager survey programs, 50,000 copies have been distributed.

The annual three volume "Guide to Eating Ontario Sport Fish" covering fish species in Northern, Southern Ontario and the Great Lakes was revised to include new test results, and 192,000 copies were distributed. The three guide books have been published for the fourth consecutive year as a part of Ontario's fish testing program conducted in co-operation with the Ministry of Natural Resources, and contain analysis for possible trace contaminants such as mercury, PCB, mirex and DDT. This Province-wide testing and information program is unique to Ontario and recognizes that every angler is entitled to know if it is safe for him and his family to consume the fish they catch. More than 50,000 fish from 878 Ontario water bodies have been tested and reported to date. Monthly bulletins on new test results are also issued.

Three new educational manuals were produced: the Citizen's Handbook series on Waste Management and Recycling, on Water Quality and Its Protection, and on Air Quality and Its Protection. Student newspapers, education fact sheets, teacher lesson plans, and elementary grade environmental education aids were also revised, reprinted and distributed.

Production of a major brochure on acid rain was commenced, with publication in English and French planned for the Fall of 1980.

Nearly two million pieces of literature were distributed. Most of the Ministry's 80 brochures and fact sheets were revised and up-dated. The Ministry now offers 27 publications in the French language. In addition, the Branch edited and distributed a number of technical and field reports.

Four issues of the Ministry newspaper "Legacy" were published and distributed to about 23,000 subscribers, with additional copies distributed at fairs and exhibitions.

Special Projects

The Branch assisted the Ontario Federation of Anglers and Hunters in launching "Pitch-In-Day", a successful one-day environmental event to clean up rivers, streams, shorelines, trails and backroads. An estimated 50,000 Ontarians participated and collected more than 200 tons of litter and junk. Promotional assistance in support of the OFAH program included advertising in all Ontario daily and weekly newspapers, TV commercials and news releases.

For the second year, results from "Operation Skywatch" were impressive. A squadron totalling 85 women pilots flew volunteer environmental patrols along the shorelines of the Ottawa River, St. Lawrence River and the Great Lakes. Skywatch is a joint venture of the Ministry and the Ninety-Nines Inc., the international organization of women pilots. The voluntary program has been expanded to include members in Toronto, Ottawa, Hamilton, London, Sarnia and Windsor. Information Services maintains regular liaison with Ministry regional co-ordinators of Skywatch, who provide the Ninety-Nines with film and equipment and direction for patrols.

The Information Branch, the Waste Management Advisory Board and the Packaging Association of Canada initiated a bi-annual packaging and design competition for post-secondary students to encourage designers of tomorrow to think in environmental terms and thereby reduce material and energy waste from packaging. Awards were presented at a Ministry exhibit of student design entries in conjunction with the "Pac-Ex" conference at the Industrial Building, CNE.

Displays and Exhibits

The Ministry was also represented by exhibits featuring resource recovery, garden composting of garbage, pesticide safety and other graphic displays and films at the Canadian National Exhibition in Toronto, the Central Canada Exhibition in Ottawa, the International Plowing Match, the Royal Agricultural Winter Fair, the Do-It-Yourself Show in Toronto, and exhibitions at Sudbury, Thunder Bay and Sault Ste. Marie. An estimated audience of 800,000 viewed these exhibits.

For the first time, the Branch operated a display at the Montreal Boat Show, known as "Salon Nautique". Information on Ontario's boating regulations was distributed in English and French in order to inform Quebec sailors about waste disposal methods and facilities in the use of Ontario waterways.

Public Meetings

Information "open houses", citizen information committee meetings, public meetings and project-oriented community education programs were conducted throughout the Province, largely as part of the Ministry's programs concerning industrial waste facility proposals and control programs. During 1979-80 the public affairs co-ordinator assisted in the planning, co-ordination and execution of 33 such public meetings.

The Branch also co-ordinated the opening of 10 sewage and water treatment systems. Water treatment plants were opened in Fort Erie, Mount Brydges, Ayr, Hearst and Mississauga. Water pollution control plants were opened in Petrolia, Wyoming, Killaloe Station, Ayr and Blind River.

Education

A highlight of the educational program was the completion of the film "Exploring Our Environment", which describes the Ministry's summer Environmental Explorations program in schools, provincial parks and private camps during June, July and August.

This touring environmental explorations program for schools, day camps, resident camps and provincial parks was dubbed KEEP (Kids Environmental Education Program) for the IYC year. Two crews of four university students toured the Province for 14 weeks, visiting 18 schools, 33 camps, 27 provincial parks and staged one professional development day for teachers. A total of 6,781 people were reached through the program with the "spin-off" effect expanding to approximately 24,000 children and adults.

The United Nation's observance of the International Year of the Child (IYC) was a highlight of the educational program. Six activities were completed including the production and printing of a special manual for parents and children entitled "Introducing Your Child to Nature". As well, the Ministry, in co-operation with the Ministry of Culture and Recreation and the North York Board of Education Forest Valley Outdoor Education Centre, produced an 80-slide, synchronized sound show, "Children and Nature", interspersing environmental outdoor education and the objectives of the IYC event.

The third annual workshop for special education teachers for handicapped children sponsored by the Ministry was staged at the Bolton Outdoor Education Centre with participation this year the highest ever. Sixty-six teachers attended the three-day workshop with the instructors and session leaders from outdoor education centres, conservation areas, universities and boards of education throughout the Province.

Films/Photography

Ministry films were used in 1,003 showings to 39,090 persons. In addition, five films were booked for 40 showings on television, where they were seen by an audience estimated at 530,400.

Branch staff prepared films, VTR and A/V slide shows on a range of activities including: acid rain, the Ministry as a corporation; the Rideau River Study;

Operation Skywatch; Metric Conversion; the York-Durham Water and Sewage Control System.

Branch staff also continued regular aerial surveillance and photography on behalf of Legal Services and the technical branches. The photographic reports and surveys obtained were used as exhibits at hearings and as evidence in Ministry legal proceedings.

Library

The Library Services Branch, consisting of both the main library at 135 St. Clair Ave. W. in Toronto, which serves Ministry staff and the public, and the laboratory library on Resources Rd. in Etobicoke, which serves the Ministry's scientific staff, responded to 10,309 reference questions, loaned out 18,955 books, and processed 41,975 photocopies of information material during the year. The libraries acquired 5,941 technical books and documents, subscribed to 260 journals which were widely circulated throughout the Ministry, conducted 1,085 computer searches for scientific material, and acquired 4,519 U.S. Government documents on microfiche.

A coin-operated photocopier was installed in the main library to increase the public's access to environmental information. A public reading room is planned for opening in the Fall of 1980 to accommodate the Ontario Government's policy on public access to information.

Personnel Services Branch

Director: R.E.B. Burns

The Personnel Services Branch was able to effect the Central Agency mandate to complete the broadbanding project in 1979-80 with the exception of certain positions in the general scientific module where standards had not been finalized by the Central Agency.

As a result of the broadbanding project, many Ministry positions that had been identified by classification as management positions, but whose duties did not meet the management exclusion criteria under the Crown Employees Collective Bargaining Act, were transferred to the Bargaining Unit. Incumbents of the positions going to the Bargaining Unit were advised accordingly.

The number of competitions for vacant positions in the Ministry increased slightly over the previous year.

The Personnel Services Branch was assigned the responsibility for implementing a training program in relation to Project Access. This program to improve the way government conducts business with the public resulted in several training sessions being conducted within the Ministry by the Women's Advisor and the Staff Development Co-ordinator. The Ministry continued to conduct internal staff development courses; in addition, the utilization of Central Agency staff for the running of selection process workshops increased.

Training and Certification

The Training and Certification Section is responsible for the Ministry's technical training program in pollution abatement and control and, in co-operation with other agencies, the certification programs for Ministry and non-Ministry personnel.

During 1979-80, the Section conducted 57 courses, workshops and seminars that were attended by 700 Ministry and 760 non-Ministry personnel. Twenty-six trainees were from provinces other than Ontario. Seventy-two Ministry personnel were recertified, and three Ministry and six non-Ministry personnel obtained initial certification in the identification of opacities of visible emissions. Eleven Ministry and eight non-Ministry personnel were certified as Noise Control Officers Class III, having completed all four parts of the Acoustics Technology Certificate Course.

Two new workshops—handling hazardous materials emergencies and wastewater collection system operations and maintenance—were included in the program. A number of short workshops on pump maintenance were conducted in the Ministry's North-eastern and Northwestern Regions. Basic gas chlorination workshops were held in Ottawa and Burlington for Municipal staff.

The section continued to participate in the development of a program for the voluntary certification of water and wastewater utility operators. Information on progress in this area was presented at a number of meetings of operators and associations at various locations in the Province.

Development of the education centre at the Ministry's experimental facility, Brampton, continued. Because of government restraints, new construction will be delayed. Alternative solutions to provide additional classroom, laboratory and workshop facilities were being investigated at year-end.

Affirmative Action

The Affirmative Action Program under the administration of the Women's Advisor continued with the activities established in 1978-79. Included were monthly meetings with the Women's Advisory Committee and meetings with the six Regional representatives. Three editions of the newsletter were produced as well as a brochure "Women in the Environment" which will be used in Outreach activities. A resource handbook containing a wide scope of pertinent information for all Ministry employees was about to go to print at year-end. An index of all courses, with emphasis on extension courses at Ontario universities and colleges and arranged by areas of study, was also being prepared. Numerical targets were set for hiring or promotion in six areas in which women have been under-represented in the Ministry. Outreach activities at the high school level throughout the Province are planned to help increase the pool of qualified women in science and engineering.

Safety

As of April 1, 1979, the responsibility for development of the safety program and safety policy

was returned to the Branch. In October 1979, the Occupational Health and Safety Act was proclaimed. As a result, the Branch immediately initiated training for all supervisory staff on the implications of the legislation. Work also progressed on the rewriting of the Ministry Safety Policy and Procedures Manual.

Employee Relations

At least five local and Ministry employee relations committees were active in 1979-80. Much of the discussion within these committees centred on health and safety, but other topics such as hours of work, project transfers and clothing issue received much attention. As a direct result of discussion by the Ministry's Employee Relations Committee, an understanding was reached between the Union and the Ministry on the formulation, structure and function of safety committees under the legislation. The Ministry was proceeding to formulate the committees in conjunction with this understanding at year-end. Agreements concerning compressed work weeks were also signed in two locations as a result of local employee relations committee meetings.

French Language Services

Co-ordinator: G. MacNaughton

The Ministry of the Environment hired a full-time French language services co-ordinator in August 1979 to develop and implement a Ministry policy on French language services in order to assist the Ministry in responding to the needs of the French-speaking population in Ontario. The co-ordinator works within the Ministry to plan for improved French language services with the general public and maintains a liaison between the Franco-Ontarian community and the Ministry.

Activities during the year included: the establishment of a Ministry French language services policy covering communications, information, forms, signage, staffing and French language training and the compilation of an inventory of staff with a French-speaking capability. The co-ordinator also reviewed all Ministry forms and publications and identified those that should be made available in both French and English. As well, steps were taken to increase the number of staff involved in French language training.

At year's end, the Ministry offered 27 publications in the French language, including Cottage Country, an environmental manual for the cottager, and the annual three-volume "Guide to Eating Ontario Sports Fish". Several news releases were also distributed in French to Francophone areas of the Province. For the first time, the Information Services Branch operated a display at the Montreal Boat Show, known as "Salon Nautique", with Ontario's boating regulations distributed in both English and French in order to inform Quebec sailors about waste disposal methods and facilities in the use of Ontario waterways.

boards and commissions

The Waste Management Advisory Board

Chairman: R.H. Woolvett

The Waste Management Advisory Board was established in 1975 by Order-in-Council to provide advice to the Minister of the Environment on matters relating to the management of waste in Ontario, with particular emphasis on the means of reducing waste generation and recovering valuable materials from the waste stream.

During 1979-80, the Advisory Board undertook a major review of its terms of reference, which, with the concurrence of the Minister, were made to read as follows:

- "to provide advice to the Minister on any matter which the Minister may refer to the Board in writing;
- "to provide comment or advice directly to the Minister on any matter of high public concern in the short-, medium-, or long-term related to the reduction and management of wastes in Ontario;
- "to review and advise the Minister directly on the priorities for action by the Province in the total area of waste management, and also;
- "to comment on the effectiveness of existing waste management programs and activities."

Four original members of the Advisory Board resigned during the year; Mr. P.C. Eberlee (Vice-Chairman), Mr. M. Hotte, Mr. G.R. Robertson, and Professor M. Wayman. Replacement member appointments were pending at year-end, as was the appointment of an additional Board member intended to increase the Board's complement to 12 members. The Board held eight meetings totalling 13 days in 1979-80.

The Advisory Board conducted a considerable number of investigations during the year and published a wide variety of reports and other documents prepared by Board member committees, secretariat staff, and contracted consultants. Subject areas selected for study by the Board are chosen on a priority basis aimed at achieving maximum gains in waste management.

In the area of waste management planning: a consultant was chosen to begin development of a strategic waste management planning model; the development and pilot implementation phases were completed of a proposed waste management accounting system for municipalities; a study was completed of fiscal and regulatory methods for reducing the

environmental impacts of urban waste; an investigation was conducted of how government waste management practices could be improved; an analysis was completed of the evolution of the "throwaway society"; a study was completed of attitudes and positions of industrial, labor and consumer groups towards products with recycled content.

In the area of source separation: policy proposals were developed in conjunction with the Waste Management Branch and the Program Planning Branch for submission to the Minister; work continued on the preparation of guidelines for implementing residential source separation programs; a state-of-the-art study was completed of significant existing and proposed residential source separation programs; an evaluation was conducted of the role of handling stations in waste reclamation systems; a pilot project, co-sponsored by the Board and Environment Canada, was run in the Kitchener-Waterloo area to recover used motor oil from do-it-yourself oil-changers; assistance was given to the Ministry of Correctional Services towards setting up waste recovery programs in Ontario prisons; funding was provided for the analysis of a glass source separation program in the City of Kanata, in Ottawa-Carleton.

In the area of paper recovery: the Working Group on Waste Paper Utilization completed its two-year work program, which included the development of waste paper flow charts for the Province; the Board participated in a pilot project run by the Ministry's Waste Paper Reduction Committee; guidelines for implementing an office waste paper recovery program were completed and published; a report was completed on the recovery of waste cardboard from marginal (small-volume) sources.

In the packaging area: the Board and Ministry co-sponsored an environmental packaging design competition for students enrolled in post-secondary schools as well as an exhibit at PAC Ex '79, the packaging industry trade show, at which competition awards were presented. Discussions were also continued with the Packaging Association of Canada on the environmental aspects of packaging; the use of refillable and non-refillable containers for carbonated soft drinks continued to be monitored; attempts were continued to have a new family of refillable containers for fluid milk developed; a report was completed on the feasibility of making wine and spirits containers returnable to LCBO outlets.

In other areas: a state-of-the-art assessment of litter abatement programs was completed; a home composting kit was published.

The Advisory Board's recommendations to the Minister of the Environment during 1979-80 were concerned with its terms of reference, waste management planning, provincial policy on source separation, paper consumption, milk packaging and wine and spirits packaging.

The Environmental Assessment Board

*Chairman: K.H. Sharpe

The Environmental Assessment Board conducts public hearings on environmental issues under The Environmental Assessment Act, The Ontario Water Resources Act and The Environmental Protection Act. Hearings are also held by the Board under Orders-in-Council, as directed by Cabinet.

Board membership on March 31, 1980 consisted of 18 persons, including two new members appointed during the year—Mr. D.M. Coolican of Ottawa and Mr. W.A.J. Roy of Paincourt.

During 1979-80, the Board conducted 26 hearings under The Ontario Water Resources Act. These hearings pertained to applications for approval of the construction or extension of mechanical sewage treatment plants and lagoons, as well as sanitary and storm sewers.

The Board held nine hearings under The Environmental Protection Act concerning applications for approval of landfill sites or landfill site extensions. One of these hearings concerned an application for the approval of a waste transfer station. Board reports on hearings, containing recommendations, are forwarded to the Director of the Environmental Approvals Branch, as required by statute.

The Board's report of the Order-in-Council hearing into uranium mine expansion in the Elliot Lake area was forwarded to the Minister in May 1979. (This hearing began in November 1976 and ended in March 1979.) The Order-in-Council hearing undertaken in March 1979 into the proposed burning of polychlorinated biphenyls at the St. Lawrence Cement Company in the City of Mississauga had not been conducted by the year-end.

The first hearing under The Environmental Assessment Act was referred by the Minister to the Board late in the year and was scheduled to commence in April 1980.

*B.E. Smith was appointed chairman on the retirement of K.H. Sharpe in October 1980.

The Pesticides Advisory Committee

Chairman: Dr. G.S. Cooper

Established under The Pesticides Act, 1970, the Pesticides Advisory Committee annually reviews the Act, its regulations, the government publications concerning pests and pesticides. The Committee also enquires into matters relating to pesticides and the control of pests as

deemed necessary or as prescribed by the regulations.

In 1979-80, the Committee consisted of a chairman and 14 members drawn from universities, agriculture, industry, the provincial civil service and the federal government. Dr. D.N. Huntley, Chairman since 1976, retired in March 1980, and was succeeded by Dr. G.S. Cooper.

The Committee recommended several changes to Ontario Regulation 618/74; reassessed 17 previously classified compounds, seven of which were placed in Schedule 1; reviewed and evaluated the environmental impact, toxicity and hazard of ten new or previously non-classified active ingredients; evaluated 205 newly registered pesticide products and recommended for each a classification for storage, sale and use in Ontario. A field trip to observe spray practices by three provincial government agencies was carried out in June 1979, and recommendations were submitted to the Minister. In addition, an on-going review and assessment of current scientific data relative to phenoxy herbicides was continued and accelerated, while a review of compounds used for the control of spruce budworm in Ontario was initiated.

The Committee continued a research program established in 1973 with three major objectives:

- (1) to find alternative pesticides for those deemed environmentally hazardous and those restricted in use;
- (2) to determine potential environmental hazards with pesticides currently in use;
- (3) to reduce pesticide input into the environment.

The Committee received 45 research proposals, 26 of which were funded by the Ministry through the Committee at total amount of \$296,775. A two-day research seminar was held in January 1980, at which recipients of grants reported on their findings. An assessment of this research is prepared annually and submitted to the Ministry.

All 1979-80 publications of the Ministries of Agriculture and Food, Environment and Natural Resources concerned with pesticides were reviewed and endorsed prior to printing and distribution.

The Farm Pollution Advisory Committee

Chairman: O. Crone

Consisting of four farmers, this Committee provides objective assessments of farm environmental situations as requested by Ministry officials. The Committee visits farms to investigate complaints and makes recommendations, where deemed necessary, concerning manure storage and spreading, cultivation, yard drainage and ventilation of livestock and poultry buildings.

In 1979 the Committee investigated six farm operations which Ministry of the Environment staff had been dealing with as a result of citizen complaints. Two were pork producers, two beef, one horse and one chicken producer. Recommendations to upgrade operational practices were made with regard to four of the investigations.

The Committee also investigated seven farm operations in the Southwestern Region which had had manure spills in the Spring, causing fish kills, and advised on how to avoid future spills.

The major problem dealt with in 1979 was manure entering into watercourses.

The Environmental Appeal Board

Chairman: L.C. DeGroot

Established under The Environmental Protection Act, 1971, the Environmental Appeal Board provides an appeal mechanism for persons affected by certain decisions made by the Ministry of the Environment or local health units. The Board consists of 12 part-time members, including the Chairman, from various occupations and parts of the Province.

On November 13, 1979, The Pesticides Amendment Act was given Royal Assent with the result that the Pesticides Appeal Board was dissolved and its responsibilities transferred to the Environmental Appeal Board. Therefore, in accordance with The Pesticides Act, 1973, the Environmental Appeal Board now also provides an appeal mechanism for persons affected by certain decisions of the Ministry of the Environment regarding the control of pesticides.

In 1979-80, the Board received 52 valid appeals. Approximately 66 per cent of the appeals concerned decisions of local health units on private sewage systems. The remaining appeals resulted from Ministry of the Environment decisions regarding waste disposal sites, waste management systems, waterworks and air pollution control. The board also dealt with one appeal under The Pesticides Act that had not been heard by the Pesticides Appeal Board when it was dissolved.

The Board held 28 days of hearings in 1979-80. It resolved 37 of the appeals received during the year as well as nine appeals from the previous year. Two appeals from the previous year remained in abeyance, while hearings in two matters were not yet completed. At year-end, decisions remained to be issued, or hearings held, on 15 appeals.

The Royal Commission on the Northern Environment

Chairman: J.E.J. Fahlgren

The Royal Commission of the Northern Environment was established in July 1977 to determine the effects of major enterprises north of the 50th parallel on the natural environment and social, economic and cultural conditions in Northern Ontario to investigate the feasibility of alternative uses of natural resources; to suggest ways and means of assessing and deciding on environmental aspects of major enterprises.

In 1979, recognizing that the delivery of its program is the dominant role of the Commission, Commissioner Fahlgren restructured the organization so that all Commission programs are delivered through the Thunder Bay head office from where all activities are directed. The support program activities such as library services, finance and administration are based in the Toronto office. The Commission also continues to maintain an information office in Timmins.

The objectives and work program announced by Commissioner Fahlgren in November 1978 have been fine-tuned to a clearly-defined "Future Directions" program from which specific studies and other activities continue to be derived.

To name a few:

An agreement was negotiated with Lakehead University to undertake a study of the economic future of forestry and related activities in and around Ontario north of the 50th parallel. Through analysis of such

aspects as markets, transportation, wood availability, mill costs and capital costs, this study is establishing what the likelihood is that new forest industry development or other activities related to forest products will take place in the area.

Another contract has been negotiated with the Laurentian University to examine factors governing the prospects for mining development north of 50° latitude. These include: world market demand and alternative supply for base and precious metals and uranium; mineral occurrences; cost factors related to the opening of new mines; and environmental regulations.

A study is also under way of methods to assess and evaluate socio-economic impacts in a northern environment which is typically characterized by fragile ecosystems, large-scale natural resource based developments and a sparse, predominantly native population.

During this past fiscal year, the Commission supported the public interest program and subsidized 37 recipients in the amount of \$250,000. Submissions which may be of interest to the public at large will be published.

The Commission is negotiating with native organizations to develop a public interest subsidy program directly related to the aims and objectives of the "Future Directions" program. This subsidy program would involve the native communities in the gathering and collecting of data and information essential to the determination of alternatives and/or consequences related to the development of major enterprises in the north.

Commissioner Fahlgren is currently preparing an interim report, anticipated to be released early in 1981.

appendices

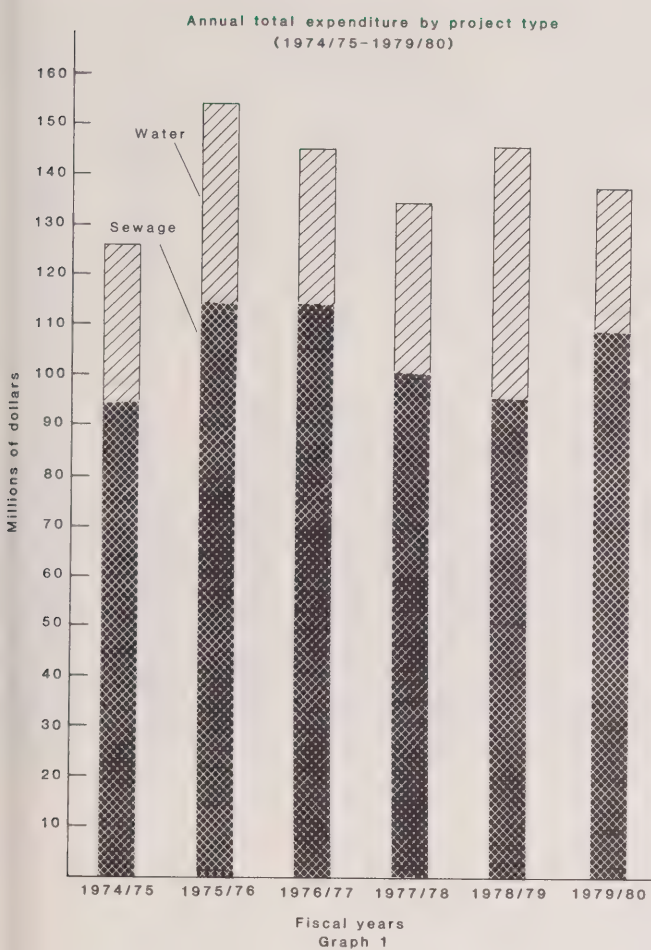


TABLE I

CAPITAL CONSTRUCTION PROGRAM
Annual Total Expenditure by Project Type

Fiscal Year	Sewage	Water	Total* (\$ millions)
1972/73	54.4	26.0	80.4
73/74	68.4	13.1	81.5
74/75	94.8	32.0	126.8
75/76	114.8	40.1	154.9
76/77	114.8	31.2	146.0
77/78	101.0	34.1	135.1
78/79	96.6	50.7	147.3
79/80	110.6	28.9	139.5

*Includes costs of engineering, property and miscellaneous items as well as contract prices.

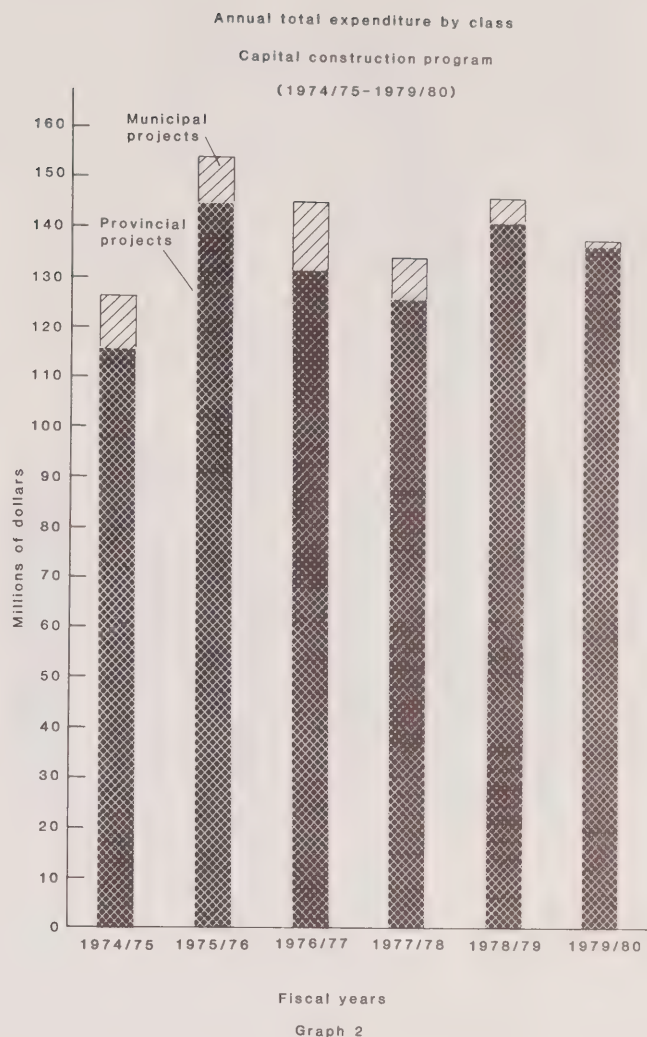


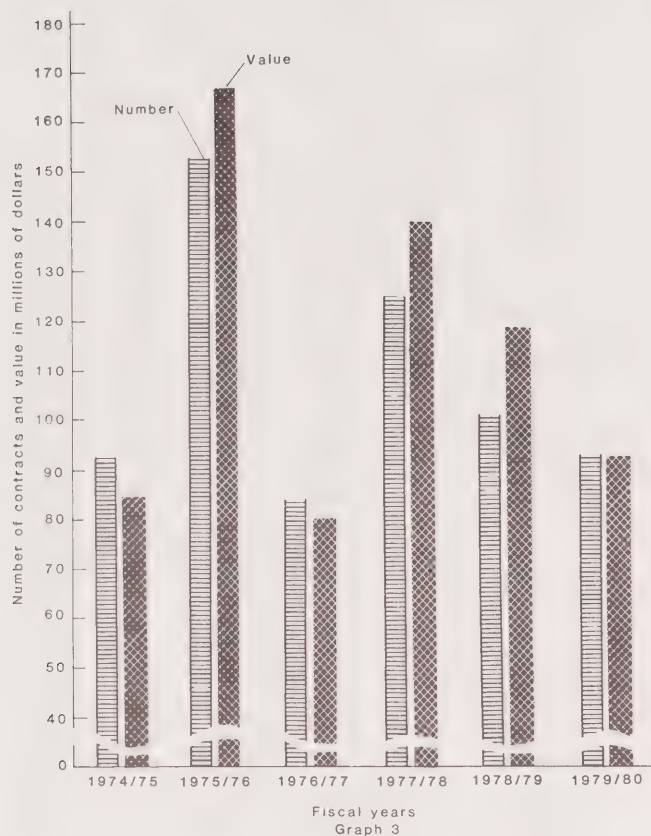
TABLE II

CAPITAL CONSTRUCTION PROGRAM
(including engineering design, property acquisition, misc. expenditures)

Annual Total Expenditure by Class

Fiscal Year	Provincial Projects	Municipal Projects	Total (\$ millions)
1972/73	77.6	2.8	80.4
73/74	75.5	6.0	81.5
74/75	115.4	11.4	126.8
75/76	145.2	9.7	154.9
76/77	131.8	14.2	146.0
77/78	127.0	8.1	135.1
78/79	142.9	4.4	147.3
79/80	138.3	1.2	139.5

Number and value of contracts tendered annually
(1974/75-1979/80)



Annual volume of activity
(1974/75-1979/80)

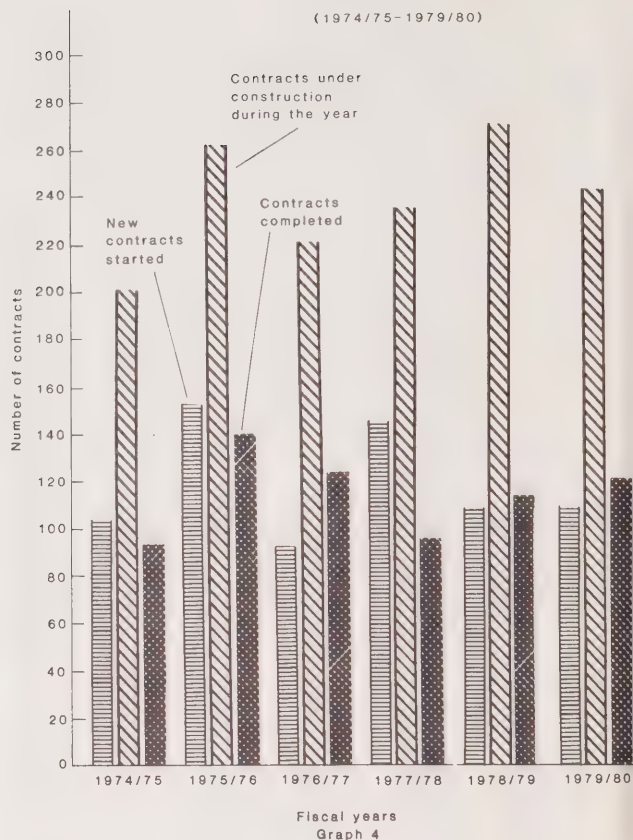


TABLE III

CAPITAL CONSTRUCTION PROGRAM
Number and Value of Contracts
Tendered Annually

Fiscal Year	Number	Value (\$ Millions)
1972/73	99	72.4
73/74	108	91.3
74/75	92	84.1
75/76	153	167.6
76/77	84	79.6
77/78	125	140.5
78/79	99	116.3
79/80	93	93.0

TABLE IV

CAPITAL CONSTRUCTION PROGRAM
Annual Volume of Activity

Fiscal Year	Started	(Number of Contracts) Under Construction	Completed
1972/73	88	166	92
73/74	108	182	82
74/75	102	202	93
75/76	153	262	139
76/77	92	215	124
77/78	145	236	96
78/79	109	249	115
79/80	110	244	122

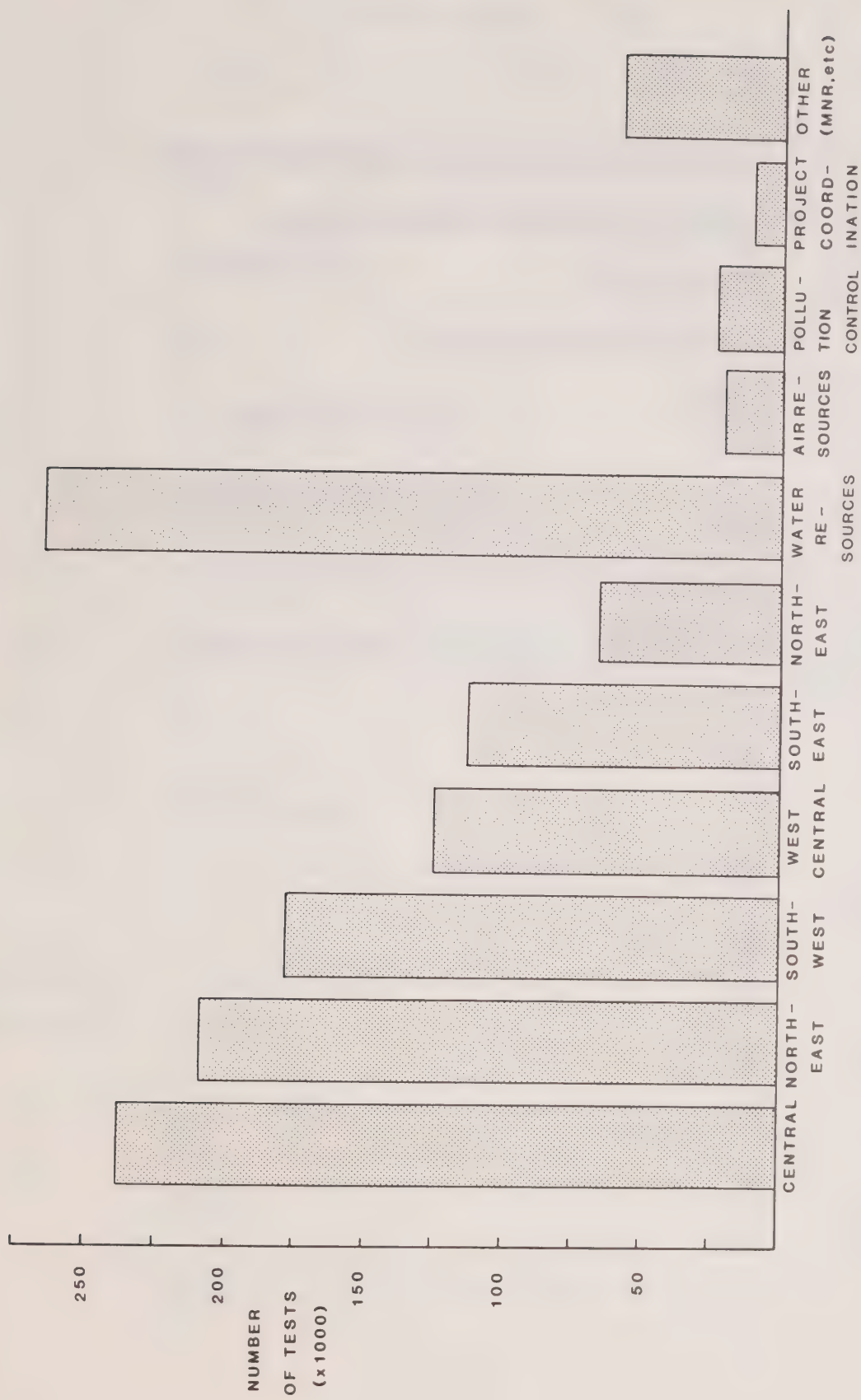


Diagram 1: Laboratory workload by region/branch, 1979/80

DIAGRAM 2-MOE PROGRAMS-LABORATORY SUPPORT

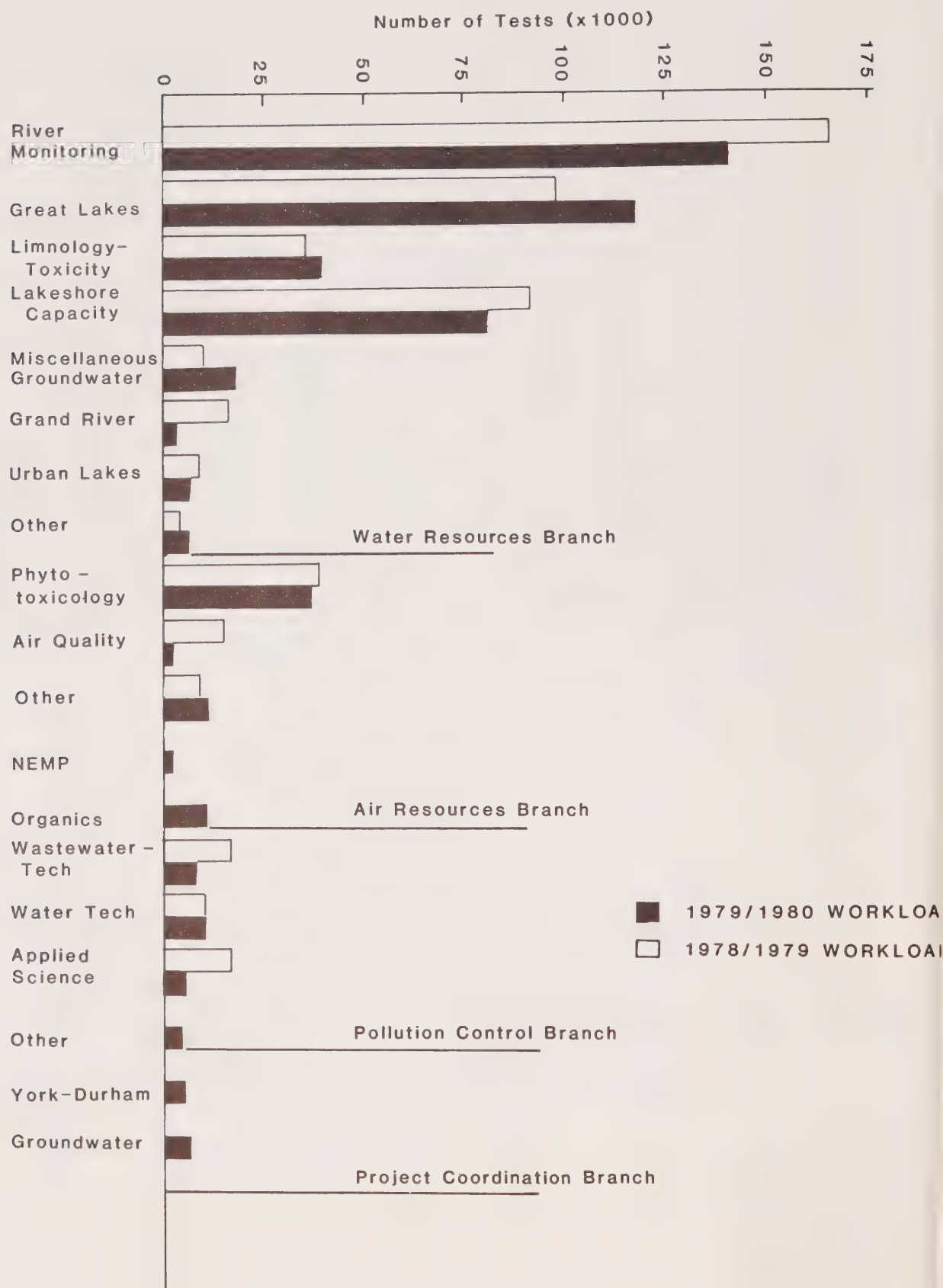


DIAGRAM 2 (Con't)-MOE PROGRAMS - LABORATORY SUPPORT

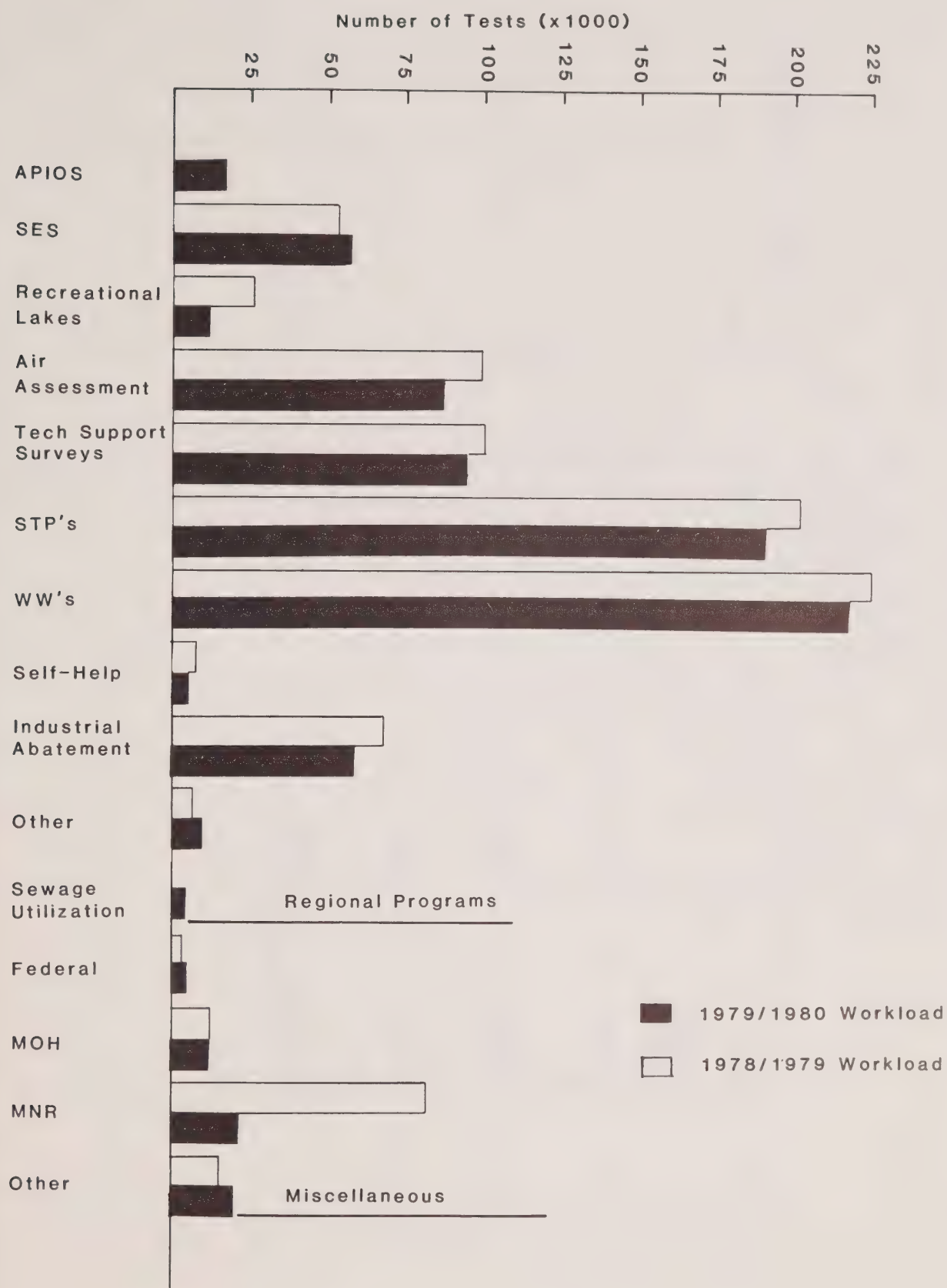


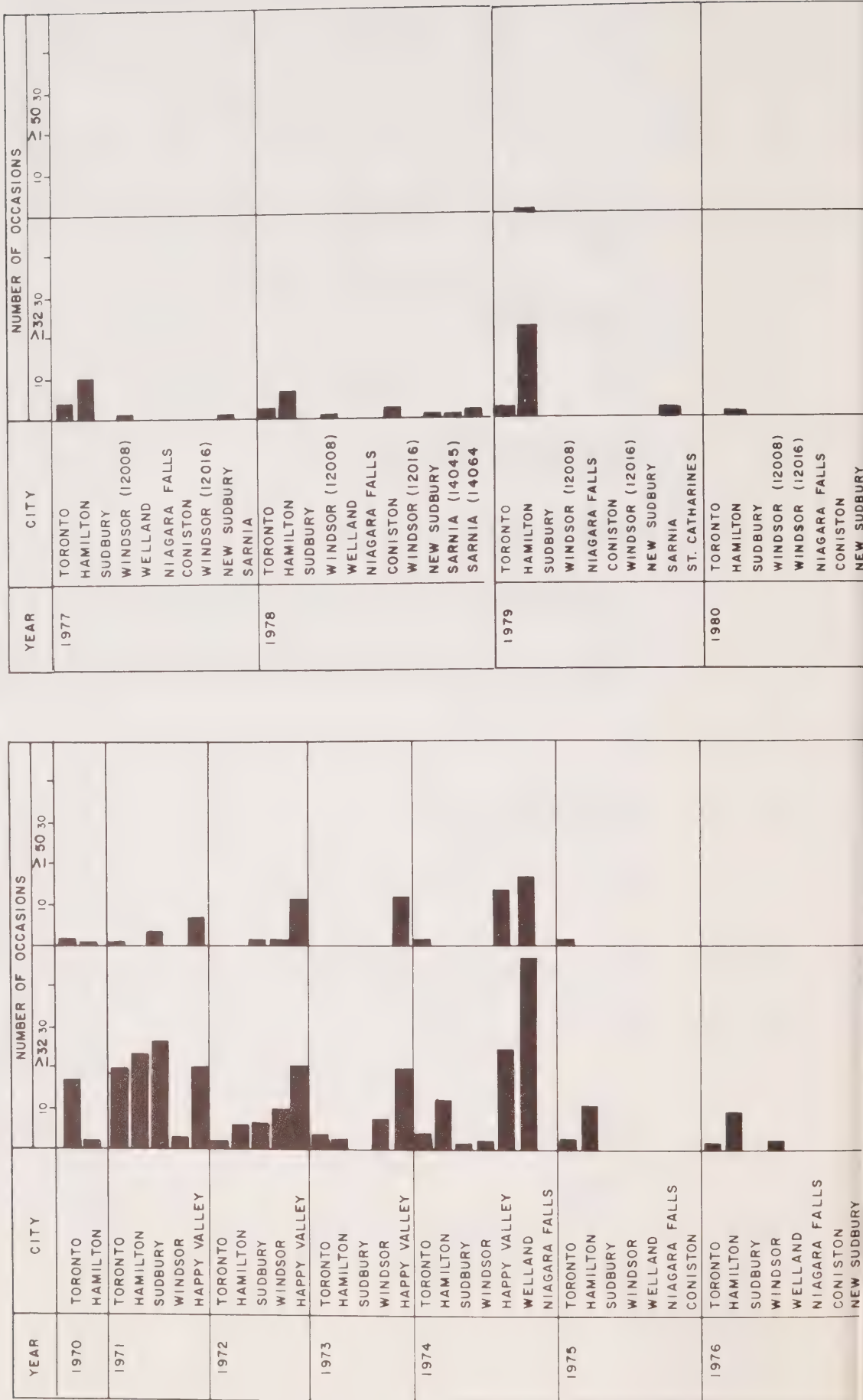
TABLE IV

ONTARIO'S AIR POLLUTION INDEX

DATE STARTED

TORONTO MARCH 23, 1970
HAMILTON JUNE 15, 1970
SUDBURY JANUARY 16, 1971
WINDSOR MARCH 19, 1971
HAPPY VALLEY MAY 13, 1971
(CLOSED JAN. 1975)

WELLAND JAN. 1, 1974 (CLOSED OCT. 26, 1978)
NIAGARA FALLS NOVEMBER 1, 1974
CONISTON FEBRUARY 18, 1975
NEW SUDBURY MARCH 1, 1976
SARNIA (14049) DEC. 1, 1977 (CLOSED AUG. 30, 1978)
SARNIA (14064) SEPTEMBER 1, 1978



CAZON
EV
- AS6

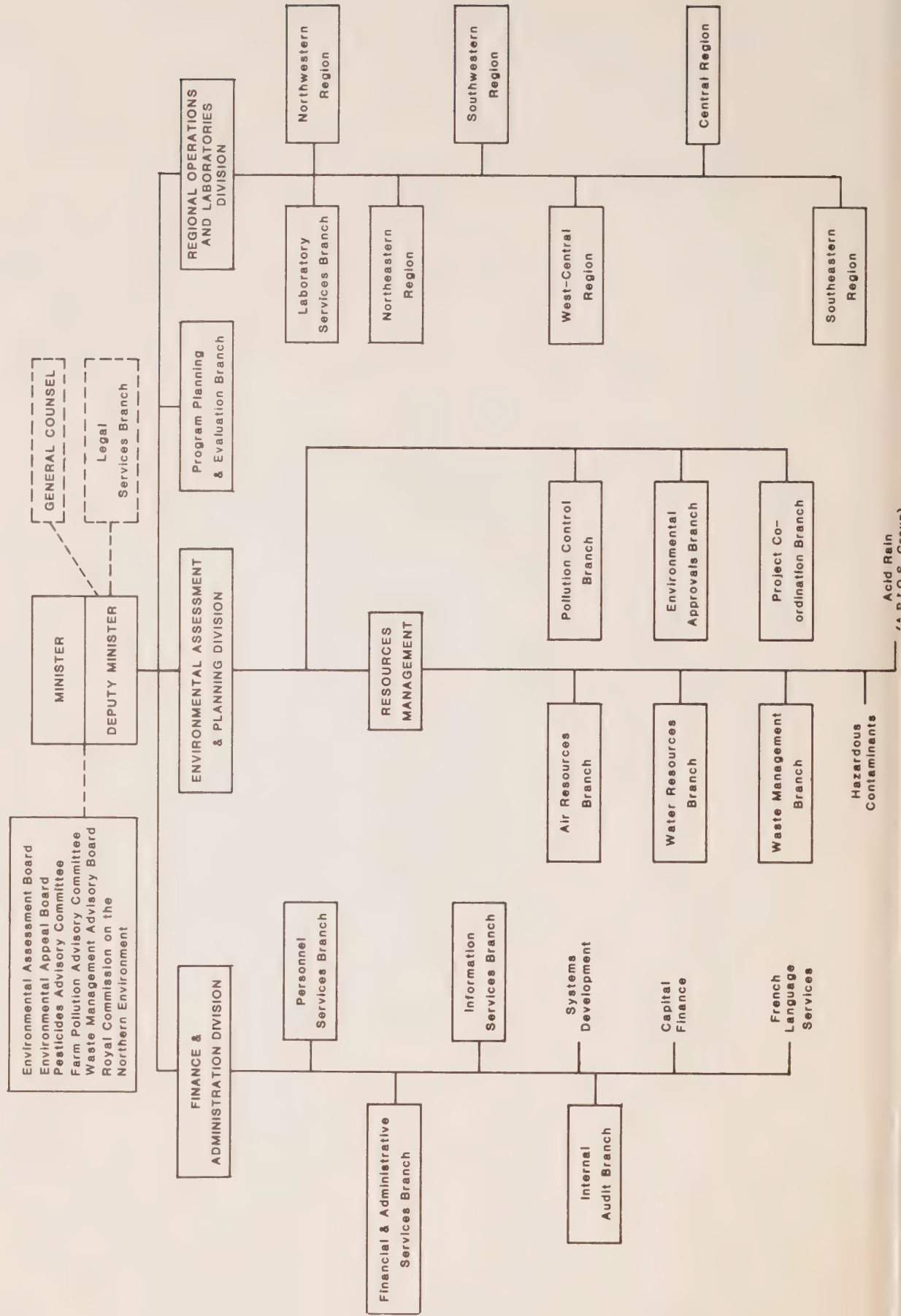
Annual Report 1980~1981



Ministry of the Environment

Ontario

MINISTRY OF THE ENVIRONMENT-April 1, 1981



contents

Organization Chart	Frontispiece
Letters of Transmittal	2
Achievements 1980-81	3
Deputy Minister	7
Program Planning and Evaluation Branch	7
Legal Services Branch	8
 Environmental Assessment & Planning Division	 9
Air Resources Branch	9
Water Resources Branch	12
Pollution Control Branch	18
Environmental Approvals Branch	21
Project Co-ordination Branch	23
Waste Management Branch	27
 Regional Operations and Laboratories Division	 31
Northwestern Region	31
Northeastern Region	35
Southeastern Region	36
West Central Region	38
Central Region	40
Southwestern Region	42
Laboratory Services Branch	43
 Finance and Administration Division	 47
Financial and Administrative Services Branch	47
Capital Financing Office	48
Systems Development	48
Internal Audit Branch	49
Information Services Branch	49
Personnel Services Branch	51
French Language Services	51
 Boards and Commissions	 53
The Waste Management Advisory Board	53
The Environmental Assessment Board	54
The Pesticides Advisory Committee	54
The Environmental Appeal Board	55
The Farm Pollution Advisory Committee	55
The Royal Commission on the Northern Environment	55
 Appendices—Charts and Tables	 57
Annual Total Expenditure by Project Type	57
Annual Total Expenditure by Class	57
Number and Value of Contracts Tendered Annually	58
Annual Volume of Activity	58
Water and Sewage Treatment Projects Completed in 1980-81 by Region	59
Ontario Air Pollution Index—1970-1981	63

Ce rapport est également publié en français. On peut en obtenir un exemplaire en s'adressant à la librairie du gouvernement de l'Ontario ou aux bureaux régionaux ou de district du ministère de l'Environnement.



To:
The Honourable
Keith C. Norton
Minister.

Sir,
I have the honour to submit
for your approval the annual
report of the Ministry of the
Environment for the year
1980-81.

Respectfully submitted,

A handwritten signature in cursive script, reading "G. Raymond".

Gérard J.M. Raymond,
Deputy Minister

To:
His Honour,
The Lieutenant-Governor
of the Province of Ontario.

May it Please Your Honour,

I take pleasure in presenting
the annual report of the
Ministry of the Environment
for the fiscal year beginning
April 1, 1980, and ending
March 31, 1981.

Respectfully submitted,

A handwritten signature in cursive script, reading "K. Norton".

Keith C. Norton, Q.C.
Minister

Achievements 1980-81

The goal of the Ministry of the Environment is to achieve and maintain a quality of the environment, including air, water and land, that will protect human health and the ecosystem and will contribute to the well-being of the people of Ontario.

To achieve this goal, the Ministry has established the following programs:

1. Ministry Administration Program
2. Environmental Assessment and Planning Program
3. Environmental Control Program
4. Waste Management Program

The Ministry is committed to providing efficient, direct service from six regional and 23 district offices. They serve as key delivery points for inspection and pollution abatement activities, local approvals and services and quick, effective action on pollution problems.

The Ministry enjoys a close working relationship with municipalities, particularly in providing consultation and development services for water management and pollution control.

Important activities and achievements have included:

- the start of a broad attack on the problem of acid rain in Ontario;
- taking positive action to deal with Ontario's liquid industrial waste problem;
- further construction of water and sewage systems, including completion of 26 municipal water works and 32 municipal sewage works;
- expansion of the Ministry's laboratories and laboratory services, including the addition of new scientific equipment and research facilities to improve the detection, analysis and control of hazardous contamination;
- continued progress in air pollution abatement, resulting in a substantial improvement in the air quality of major industrial urban centres;
- a province-wide investigation of unrecorded waste disposal sites.

More details are given below and in the individual reports of Divisions and Operating Branches.

The Honourable Keith C. Norton, Q.C. was appointed Ontario Minister of the Environment on April 10, 1981, transferring from his former portfolio as Minister of Community and Social Services, an office he had held since February 1977.

During the 1980-81 fiscal year, the Honourable Harry C. Parrott, D.D.S. served as Minister of the Environment. Dr. Parrott was Minister from August 18, 1978 to April 1981, when he retired from political office.

Gérard J.M. Raymond was appointed Deputy Minister of the Environment on September 8, 1981. Prior to this, Mr. Raymond was Deputy Provincial Secretary of the Secretariat for Resources Development.

Graham W.S. Scott, Q.C. served as Deputy Minister of the Environment from February 5, 1979 to September 8, 1981 when he was appointed Deputy Minister of Health.

Acid Rain

Acid rain in eastern North America is due to pollution from sulphuric and nitric acid which originates chiefly from the combustion of fossil fuels, such as coal and oil from generating plants, ore smelting, petroleum refining, industrial furnaces and

from cars and vehicles of all kinds. Over half of Ontario's acid loadings from the atmosphere come from the United States.

Scientists estimate that if 1980 levels of acid loadings remain constant or increase over the next 10 to 20 years, Ontario could lose much or all of the aquatic life in as many as 48,000 susceptible lakes which have little or no limestone to neutralize the acid.

The transboundary nature of acid rain creates numerous national and international regulatory problems. Where air pollution standards differ, lax standards in one jurisdiction can allow pollutants to have a direct impact on the natural resources of another jurisdiction. Canada and the United States are consequently exploring ways to integrate and co-ordinate their scientific programs, and to reach a formal accord for abatement action.

A first major step toward negotiation of such a treaty between the two countries was taken in Washington on August 6, 1980 when a memorandum of intent to curb acid rain and resolve international air pollution problems was signed. Ontario was one of the prime movers behind the memorandum.

In November of 1980, a booklet entitled, "The Case Against the Rain" was published by the Ministry. The report describes the extent to which Ontario is affected by acid rain, the progress the Province has underway to meet the challenge and addresses the need for action both in Canada and the U.S. to curb acid rain pollution.

Copies of the report were mailed to U.S. senators and congressmen representing the northeastern states, where much of this type of pollution originates.

Ontario's stand was further emphasized in February of 1981, when Premier William Davis discussed the acid rain problem with governors of the Great Lakes states, and again in March of the same year when a presentation on acid rain was made to U.S. officials during the Ottawa meetings of President Ronald Reagan and Prime Minister Pierre Trudeau.

Also in March, the Ministry of the Environment filed a legal intervention with the U.S. Environmental Protection Agency (EPA) which asked the EPA to reject proposals from six states for a relaxation of emission limits governing 18 power plants.

In addition, Ontario asked the EPA to enforce existing emission limits on sources not in compliance, to review the regulations on emission levels governing 11 U.S. power plants and to consider control needs from the perspective of total effect on northeastern North America.

The Ministry of the Environment later filed a new submission to the EPA, expanding its earlier document to include two large power plants in Ohio.

However, the Ministry is not concentrating its efforts solely on the U.S. In May of 1980, Inco Ltd., the smelting operation in Sudbury which represents the largest single point source of sulphur emissions in North America, was ordered to reduce its emissions from 3,000 tons to 2,500 tons per working day and to have facilities in place by the end of 1982 to produce

only 1,950 tons per working day. A task force was appointed to determine how these emission levels could best be reduced to a further minimum.

In January of 1981, the Ministry placed annual limits on the emissions from Ontario Hydro, which require the utility to undertake approximately \$500 million worth of control activities immediately. Ontario Hydro, a crown corporation which supplies almost all of the Province's electrical energy, is the second largest emitter of SO₂ in the Province.

Other important aspects of the acid rain problem under study include the socio-economic effects of acid rain on Ontario areas which are affected or threatened and the sources and paths of long-range transboundary pollution.

In the summer of 1980, new networks of air monitoring stations consisting of instruments to measure deposition and to identify sources of acid rain and other pollutants related to long-range air transport were set up in 45 locations throughout the Province.

This "Atmospheric Deposition Study" is only one of a number of scientific investigations which are taking place under the Acid Precipitation in Ontario Study (APIOS). Through this major study, which is costing over \$5 million, Ontario is compiling essential scientific information required to better link and assess the source and receptor relationship of acid rain as a means of establishing effective abatement measures.

As a measure to assist development of permanent acid rain abatement programs here and in the United States, Ontario is pursuing an experimental program to determine if it can neutralize selected water bodies against further environmental damage. The program involves the addition of a neutralizing agent, calcium carbonate, slaked lime and/or limestone to affected lakes, in an attempt to restore their buffering capacity.

Air Quality

Toronto's air quality has improved so much in the past decade that there have been no air pollution alerts since 1979. Sulphur dioxide levels have dropped by 80 per cent and dust levels by 50 per cent.

The level of suspended particulate matter, the main pollutant in Hamilton, has decreased across the city ranging from 21 to 58 percent, mainly as a result of the abatement of emissions by the steel industry.

In Sudbury, since the inception of the Air Pollution Index in 1971, the number of occasions which the Index exceeded the Advisory Level of 32, has dropped from 26 to no alerts in 1980.

Similarly, the air quality of other industrial cities such as Windsor, Sarnia, Welland, St. Catharines and Cornwall has also improved since 1970.

Fish Testing Program

Further tests of sport fish from over 250 new lakes and river locations during the past year confirmed that the majority of Ontario waters yield healthy fish.

Ministry staff tested over 11,000 fish from these lakes and rivers in 1980 as part of Ontario's continuing long-term program. This new information is now combined with results from 625 waterbodies previously tested and reported—bringing the total tests to over 54,000 fish from 878 locations.

For the fifth consecutive year, the Ministry published its findings regularly in Environmental Health Bulletins and summarized the results of the fish testing program in bilingual booklets, entitled, "Guide to Eating Ontario Sport Fish".

Over 190,000 of these booklets were distributed free of charge in 1980-81. This unique testing and information program recognizes that every angler fishing in Ontario has the right to know if it is safe for him and his family to consume the fish they catch. In no other jurisdiction is the angler and the public given such consideration.

Industrial Wastes

The disposal of liquid industrial waste is a major problem in Ontario. Industry currently produces over 60 million gallons a year. Approximately 11 million gallons is disposed of in the remaining eight sanitary landfill sites in the Province, which are still accepting liquid wastes. About 5 million gallons are exported outside the Province. The remainder is incinerated, reclaimed, or disposed of in private landfill sites, at sludge farms, or sewage treatment plants.

The Government has decided to deal with this situation and to develop a comprehensive industrial waste program, including the development of facilities.

In 1979, the Ministry of the Environment commissioned an outside consulting firm to review technology and site requirements and then to recommend a location where major facilities could be constructed.

In November of 1980 a final recommendation was made by the consultant suggesting a site on land at South Cayuga. This site was proposed subject to further studies, including extensive geological testing, a geotechnical survey and the proposal was to be considered at public hearings.

The new waste facilities will be planned, developed and operated by the newly formed Ontario Waste Management Corporation.

The Ontario Government has also appointed a

three-member panel to conduct public hearings into the safety and suitability of the proposed site. The Hearing Officers have been directed to review existing data on site engineering, hydrogeology, geology and geochemistry. They are also required to meet with parties interested in or affected by the proposal.

After all the evidence is in, the panel will make its decision on site suitability. If it should be negative, the Government will accept the findings and the corporation will be instructed to find another site.

Also in keeping with the Ministry's attack on the liquid industrial waste problem, was the formation of a special task force of environmental detectives to crackdown on the illegal dumping of these wastes and other pollution offences. The thirteen people appointed have been trained in investigative techniques to serve as a special environmental police unit to assist the Ministry in enforcing Ontario's environmental laws.

Ministry staff completed a Province-wide investigation of previously unrecorded municipal waste disposal sites. They located 1,450 sites, of which 197 were marked for further study. In addition, as a precautionary measure, environmental consultants for the Ministry investigated 50 privately owned industrial waste sites across Ontario. Fifteen sites were still operating and the balance were closed sites formerly used for industrial waste disposal. As a result of the three month study, further investigation and remedial work was ordered on 11 sites and 26 sites were marked for further monitoring and study.

Servicing Development

Two large projects developed by the Ministry of the Environment were officially opened in October, 1980—the first stage of the York-Durham Water Pollution Treatment System and the Lorne Park Water Purification Plant.

The York-Durham Water Pollution Treatment System, under construction since 1975, is the largest project undertaken by Environment Ontario and the largest planned sewage system in Canada.

The Lorne Park Water Purification Plant is North America's first major underground water treatment plant.

deputy minister

Deputy Minister—Gérard J.M. Raymond

Executive Assistant—R.G. Clark

Program Planning and Evaluation Branch

Director: A. Castel

The role of the Program Planning and Evaluation Branch is to identify the broad program and resource needs of the Ministry and to co-ordinate the effective management and efficient utilization of Ministry resources. There are three main areas of responsibility.

First, the Branch analyzes Ministry policies and programs, co-ordinates policy development and provides liaison with the government's central agencies including the co-ordination of policy submissions. During 1980-81, the Ministry policy approval process involving maintenance of a Ministry Policy Manual was implemented.

Secondly, the Branch develops and maintains Ministry strategic and operational planning systems. Support was given to the Strategic Planning Committee in rewriting the Ministry's goal statement and in developing a strategic planning process. The Branch will be acting as a permanent secretariat once the process is active.

Thirdly, the Branch provides socio-economic analysis of environmental concerns and of the impact of economic activities on the environment. Increased emphasis has been placed on the development of methodologies for assessing the economic effects of acidic precipitation.

The following reports were released in 1980-81:

- 1) Manual of Environmental Policies and Guidelines;
- 2) Work Program and Budgetary Implications, 1980-81;
- 3) Management by Results, 1979-80 Year-End Report;

In addition, major studies were initiated in 1980-81 to investigate the socio-economic implications of the acid precipitation phenomenon.

Legal Services Branch

Director: J.N. Mulvaney, Q.C.

Staff of Legal Services Branch are employed by the Ministry of the Attorney General and provide legal services on a solicitor/client basis to the Ministry of the Environment.

A major function of the Branch is to conduct prosecutions under environmental legislation. The Branch screens cases being considered for prosecution, advises on the best methods of gathering and presenting evidence, and provides counsel to present these cases in court. In addition, it acts as counsel for any Director whose decision under a statute is being reviewed in a hearing before the Environmental Appeal Board or other review tribunal.

On one occasion during the year, injunction proceedings were taken to bring about compliance with Ministry orders.

During the year, under the Environmental Protection Act, 1971, 78 cases were before the courts, 37 of which resulted in convictions, 10 were dismissed, seven withdrawn and 24 still before the courts. There were six appeals from the cases convicted and dismissed.

Under The Ontario Water Resources Act, there were 27 cases before the courts, 15 of which resulted in convictions, five were dismissed, one withdrawn and six still before the courts. There was only one appeal from the cases dismissed.

Under The Pesticides Act, 1973, there were six cases before the courts, five of which resulted in convictions and one dismissed, which is being appealed.

During the year, the Legal Services Branch has become involved in Ontario's submissions to the U.S. Environmental Protection Agency with respect to acid precipitation and the formation and training of the Special Investigation Unit.

environmental assessment and planning division

Assistant Deputy Minister—J.W. Giles

Executive Director—W.B. Drowley

Air Resources Branch

Director: G. Van Volkenburgh

The Air Resources Branch supplies base information for the development of air quality management strategies and Ministry policies directed at achieving and maintaining desirable air quality in Ontario. The information consists of comprehensive air contaminant measurements, detailed knowledge of new technology and recommendations concerning air quality criteria and standards.

Air Quality and Meteorology

The main responsibility of the Section is to provide a comprehensive knowledge of the air quality in Ontario with respect to any measurable contaminant and a systems approach to air management. The Section maintains the data base and telemetering system of Ontario's monitoring network which in 1980-81 constituted approximately 1250 instruments located in 125 areas.

The following pollutants are routinely monitored: sulphur dioxide, nitrogen oxides, carbon monoxide, ozone, hydrocarbons, total reduced sulphur, fluoridation rates, dustfall and total suspended particulate matter, including components such as sulphates, nitrates, lead and other trace metals.

The Section develops and applies mathematical models to compute the quality of air and dry and wet deposition (acidic precipitation) of contaminants.

The Ontario Air Pollution Index, the basis for the Ontario Alert System, continued to be monitored and publicized daily for Windsor, Sarnia, Hamilton, Niagara Falls, Toronto, Sudbury, Coniston, New Sudbury and St. Catharines.

Atmospheric Research and Special Programs

The Monitoring and Instrumentation Unit monitors air quality in special locations (using mobile facilities) for conventional and non-routine air pollutants in support of Ministry pollution abatement programs. The development and evaluation of new instrumentation to measure the concentrations of non-routine air pollutants is also a primary function.

Extensive Air Monitoring Surveys 1980-81

Compounds	Location	Source
Organic Compounds	Junction Triangle (Toronto)	diversified industrial plants
Sulphur Dioxide Reduced Sulphur Compounds	New Toronto	rockwool manufacturing
Organic Compounds SO ₂ and Particulates	Clarkson	petroleum refineries
PCBs	Smithville	disposal and transfer site
Organic Compounds Odours	London	sewage treatment plant
SO ₂	London	train derailment
Hydrocarbons	Nanticoke	oil refining
Oxides of Nitrogen, Carbon Monoxide Particulate	Kitchener	downtown traffic
PCBs	Thunder Bay	transformer explosion
Hydrocarbons and Particulate	Toronto	rubber plant fire

In August, 1980 the Mobile Air Monitoring Unit (MAMU) was damaged by fire and was out of commission until the summer of 1981.

The Trace Atmospheric Gas Analyzer (TAGA 3000) System is a mobile mounted mass spectrometer which has an ambient air monitoring analytical capability for a wide variety of new generation pollutants, including those present in only trace amounts. These pollutants include chlorinated hydrocarbons, styrenes, methylamines, nitrosamines and many more.

The major use of the TAGA during 1980 was in the area of polychlorinated biphenyl (PCB) monitoring. Surveys in the vicinity of chemical plants in Elmira and Hamilton were carried out.

The TAGA Unit was taken out of service in August, 1980 due to an electrical wiring problem and became operational again in early 1981.

During the 1979-80 and 1980-81 fiscal years, the Unit was instrumental in the development of a combined field sampling methodology and laboratory analytical technique for ambient air PCBs. A three-phase Report describing the developmental work is now close to completion.

The Special Studies Unit is responsible for the co-ordination of activities under the Nanticoke Environmental Management Program (NEMP) and for carrying out the atmospheric chemistry and deposition (wet and dry) programs of the Sudbury Environmental Study and the Acidic Precipitation in Ontario Study.

The following were the major Nanticoke Environmental Management Program activities in 1980-81:

- An extensive monitoring network for gaseous and particulate pollutants including real-time data telemetry.
- Airborne and ground based studies on dispersion and chemical transformations of emitted pollutants.
- Mathematical air quality models for use in a supplementary control system for the area.

Major activities undertaken as a result of the Acidic Precipitation in Ontario Study included:

- the implementation of cumulative and event deposition monitoring networks to determine the wet and dry deposition fields of acids and related compounds in Ontario and the characterization of acid precipitation episodes;
- the establishment of a deposition network data base compatible with related data bases in North America; and
- the undertaking of studies to elucidate atmospheric chemical processes involved in acid precipitation, atmospheric transport and impacts of emission from local sources.

Staff published eight reports on work carried out during the active field phase of the Sudbury Environmental Study.

The Atmospheric Contaminants and Research Planning Unit assesses the potential, the possible consequences and the ultimate fate of hazardous contaminants in Ontario's air.

The Unit is also responsible for managing the Air Resources Branch Research Grants Program designed to stimulate air-related environmental research in Ontario universities.

During 1980-81, eight background reports on hazardous contaminants were completed, as well as 16 chemical dossiers.

The research grants information booklet ARB—TDA—56-80 was also revised and released.

During the year, five research projects were sponsored through the Unit involving \$136,000. Three

of these projects were carried out by external organizations.

A further 19 research projects were sponsored through the Research Grants program for a cost of \$280,000. This money was received by various universities and one community college.

Unit staff also managed five research programs under the Provincial Lottery Trust Fund Sponsorship.

Emission Technology and Regulation Development

The three units under the Emission Technology and Regulation Development Section carried out a wide range of activities in support of the Air Resources Branch.

The Regulation Development and Environmental Assessment Unit, formerly the Criteria Development and Program Planning Section, is responsible for developing standards and guidelines for new contaminants; revising and developing air regulations and guidelines; and, reviewing the air quality components of environmental assessments.

During the year, eight guidelines for new contaminants were established and approximately 30 Environmental Assessments were processed. Section staff were also involved in the revision of O.Reg. 15, and assisted in the development of the Ontario Hydro Regulation (O.Reg. 73/81) as well as the Sarnia Area Regulation (O.Reg. 151/81). The Section initiated the review and updating of the existing criteria for Incinerator Design and Operation. In conjunction with the Ministry of Labour, staff instigated a survey of fluoride emission and health effects.

The Control and Process Technology Unit, which replaced the New Technology Unit, assesses new technology for industrial processes at the request of the Ministry's Regional and Approvals Branches. It also reviews specific industries to enable specification of control technology options for standard and guidelines and examines literature for new development in control and process technology.

During the year, the unit undertook intensive review of the electrical power and major non-ferrous smelting operations in Ontario particularly with reference to reducing acid precipitation and undertook work for the Long Range Transport of Air Pollutants Abatement and Strategy Committee.

The Hazardous Contaminants Information System was expanded. Staff co-ordinated the arrangement for test destruction of PCBs. They also reviewed Ontario Hydro operations and costs with reference to development of the Ontario Hydro Regulation.

The Source Measurement Unit, which replaced the Source Assessment Unit, is responsible for reviewing the source testing reports from the regional offices; updating the source testing code; and, the production of reports on special areas of concern.

In 1980-81, staff developed specialized methods of testing for PCBs, dioxins and other hazardous chlorinated compounds from thermal incineration and completed reports on polynuclear aromatic hydrocarbons from coke ovens, odour emissions from restaurants, refinery plants, auto paint shops, and hydrocarbon emissions in Nanticoke.

Phytotoxicology

The Phytotoxicology Section conducted soil and vegetation assessment studies near 104 industrial and other sources in Southern Ontario.

The Section also investigated 206 vegetation complaints from the public; 40 per cent of these were confirmed as being caused by pollutants.

The Section collected 9,667 vegetation and soil samples for laboratory examination. In addition, a number of research studies both in the field and in controlled environment greenhouse and growth chamber facilities were conducted.

During the 1980 crop-growing season, staff conducted extensive field assessment surveys to determine the degree of photochemical oxidant (ozone and/or peroxyacetyl nitrate), injury on white bean, tomato and potato crops. Oxidant injury to crops was more severe in 1980 than in 1979.

At Nanticoke, the Section continued studies where major operations by Ontario Hydro, Stelco, and Texaco are ongoing. No fluoride or sulphur dioxide injury has been observed on vegetation in the study area to date, but ozone injury has occurred annually on established indicator plants.

Ethylene studies were conducted in the laboratory and in the field near Sarnia to determine the effects of ethylene emissions from polyethylene manufacturers. The data obtained in these studies will help in the formulation of air quality criteria and standards for ethylene.

Several field investigations were conducted in the vicinity of industries emitting atmospheric fluorides. Control orders have been issued to certain fluoride emitting industries in which compliance with acceptable vegetation effects is necessary. Fluoride studies were continued in 1980 on the St. Regis Indian Reserve, Cornwall Island to define the current area of contamination resulting from fluoride emissions from Reynolds Metals Co., and Aluminum Co. of America, Massena, New York. The results of these studies were provided to the Indian Band, the companies, and the federal government to assist in a pending lawsuit.

Vehicle Emissions

During 1980-81, staff stopped 6,023 cars in 19 locations throughout Ontario in spot checks for emission controls and exhaust pollutant levels. Of these, 3,046 cars failed to meet Ontario emission guidelines, while 344 had pollution control equipment missing, disconnected or inoperative. Charges were laid against five owners. Four were found guilty and fined. The remainder were corrected by owners on a voluntary basis.

Section inspectors visited 445 used-car dealerships and inspected 2,544 cars. As a result, 95 Violation Notices were issued; 92 were satisfactorily cleared before the vehicles were sold. The remaining three are in the process of being cleared.

Highway patrols in co-operation with OPP personnel resulted in 450 vehicles being stopped for excessive smoke emissions. Subsequently, 82 warnings and 368 charges were issued by the OPP. Vehicle owners on 268 cases were found guilty and fined; seven cases were dismissed; 93 cases were pending at year-end.

Water Resources Branch

Director: D.N. Jeffs

The Water Resources Branch provides a number of services and programs, including water resources planning and co-ordination and the development and implementation of policies and guidelines relating to water resources protection and management. The Branch co-ordinates and gives policy direction for inventory programs and data processing and analyzes and publishes monitoring and inventory data. It provides specialized technical advice to assist Regional staff and technical training and method development in support of Ministry programs. It also provides inter-agency liaison and technical representation on committees supporting the International Joint Commission (IJC) and inter-ministerial activities.

Water Management

The Water Resources Branch assisted in the preparation of Branch position papers on "The

Recommended Criteria for Pumping Tests for Small Communal Ground Water Supplies" and "The Application of the Drinking Water Objectives to Ground Water Supplies in Ontario" to assist in establishing a uniform approach for Ministry approval of small communal water-supply systems.

The Branch provided input to the Ad Hoc Committee on the Underground Storage of Petroleum Products in consultation with the Ministry of Consumer and Commercial Relations (MCCR) on the pre-1974 underground tank replacement program; staff helped to prepare guidelines on land use, monitoring and mitigation as part of the MOE Landfill Gas Committee and provided technical input to the Maple Landfill Committee.

By year end, staff had issued 488 drilling and boring licences and licensed 35 contractors for the first time.

11,108 water-well records had been received for processing. The Branch sponsored a one-day water-well drilling conference on well grouting techniques at Kemptonville for water-well drilling contractors and their employees.

Staff participated in a number of inter-agency liaison activities to promote mutually compatible policies and programs. These included: participation in preparation of a joint report to senior management of the Environment and Natural Resources ministries; proposing solutions to problems involving overlapping responsibilities in fisheries and water-resources management; participation in a Federal-Provincial Working Group on Recreational Water Quality; and co-ordination of MOE input to CORTS policy statements involving the management of the Rideau-Trent-Severn waterways.

Staff co-ordinated and participated in the activities of an implementation committee and five subordinate working groups to develop implementation procedures for the newly-developed policies and water quality objectives for management of the quality and quantity of Ontario's surface and ground water. Significant issues addressed by the working groups included the development of municipal effluent requirements, policies and procedures; surface water-quality assessment procedures; and, policy and procedures for resolution of ground-water quality interference problems.

To keep anglers in Ontario fully informed on possible contaminants in sport fish and the safety of eating or feeding their families the fish they catch, the Ministry co-ordinated the collection of information on trace contaminants such as mercury, PCBs, mirex and DDT from a variety of fish species collected throughout Ontario.

During 1980-81, the Ministry issued three environmental health bulletins containing new or updated information on contaminants in fish. In April, 1980 it published a series of bilingual booklets under the general title "Guide to Eating Ontario Sport Fish" for Northern Ontario, Southern Ontario and the Great Lakes. The booklets contain information on 54,000 fish

taken from 878 waterbodies; more than 190,000 copies were distributed free of charge.

The section has also undertaken a study to determine the potential of wetlands for year round sewage treatment. In particular, the studies are attempting to ascertain the degree of pretreatment of the waste necessary prior to discharge to the wetlands, loading rates and retention times for optimal operating conditions, land requirements and operational costs. To assist in the study, the Ministry is using two marshes. One is an artificial system constructed adjacent to the Town of Listowel's sewage treatment lagoons. It commenced operations in August 1980. It is composed of five separate treatment systems and a small control marsh to be used for monitoring rates of evapotranspiration. All cells, except the pond, have been compacted and backfilled with a mixture of sub-soil, top soil and peat and planted with cattails.

The other marsh is a long-standing natural marsh in Bradford. It was monitored for two years to establish natural nutrient fluxes. Sewage additions (mixed raw sewage and final effluent from the Bradford Sewage Treatment Plant) to this natural marsh commenced in June 1981. Both the quantity and the strength of the sewage can be varied to assess the performance of this marsh at different sewage loadings.

The Lakeshore Capacity Study is a multi-ministry co-operative project to develop predictive models concerning the effects of human development on lakes and their watersheds, particularly the capacity to accept recreational development. Field work is now completed. Compilation of results continued and final reports are in preparation.

Grand River Study

Activities related to the Grand River Basin Water Management Study continued with 1980-81 being devoted essentially to the finalization of information analysis, the evaluation of management alternatives and the preparation of the final report and supporting documents. The study is being carried out under the direction of the Grand River Implementation Committee consisting of representatives from five Ministries (Agriculture and Food, Environment, Housing, Intergovernmental Affairs and Natural Resources) and the Grand River Conservation Authority.

In addition, the final report of an inventory of ground-water resources in the Grand River basin was prepared by the Branch. This report addresses general aspects of hydrogeology and future development of ground-water throughout the basin and provides in-depth analysis of ground-water potentials for water supply for 23 communities in the basin, including the Regional Municipality of Waterloo.

In co-operation with the Grand River Conservation Authority, a continuous streamflow data base was completed for the basin, rainfall patterns were examined and flow frequency analyses were conducted for the evaluation of reservoir operations as well as predictions of storm runoff and low summer streamflow probabilities.

Stratford-Avon River Environmental Management Project

Activities related to the Stratford-Avon River Environmental Management project commenced in 1980. The project is being conducted in co-operation with the Pollution Control Branch, the City of Stratford and the Upper Thames Conservation Authority.

In the first year of this two year study, information was assembled on water quality, aquatic plants and algae, hydrology and pollutant loadings from sewage treatment plants, industrial discharges and agricultural areas. Demonstration projects of remedial measures were initiated in-stream and in the urban and rural areas. The relative significance of the pollutant inputs from various sources has been identified.

Water Resources Inventories

The last of a series of reports entitled "The Hydrogeology of the IFYGL Moira River, Wilton Creek and Thousand Islands Study Areas"; Water Resources Report 5e, was released. The report summarized the field studies undertaken by the Ministry on the Lake Ontario drainage basin as part of the International Field Year for the Great Lakes—a joint Canadian and United States contribution to the International Hydrological Decade (IHD).

The water resources study of the Humber River and Don River basins was continued and a similar study was initiated in the Credit River basin. These studies are designed to provide an inventory base for future water resources planning.

Water resources data were released in three publications.

In addition, a series of maps showing the location of observation wells, streamflow and water-quality stations in the Ministry's monitoring networks were released in three separate publications.

Water well information obtained from licensed drilling and boring contractors was published for five counties in Water Resources Bulletin 2-25, "Water Well Records for Ontario; Bruce, Dufferin and Grey", 1946-1976 and Water Resources Bulletin 2-26, "Water Well Records for Ontario; Wellington and Waterloo", 1946-1976.

Regional liaison meetings concerning all stations in the Provincial hydrometric networks (observation well, streamflow and water quality) were held to improve the networks efficiency. New stations terminated to eliminate redundancy. Monitoring for toxic contaminants was continued at selected stations in the Provincial water quality network. Improvements were made to data processing procedures to provide more cost-effective analyses and interface with retrievals from the computer master files.

Water quality trends for phosphorus, nitrogen

and suspended and dissolved solids are being investigated in southwestern Ontario. Generally higher average concentrations are experienced in the southwest than in other areas of the Province and historic changes in water quality are being related to changing land uses.

Engineering, Scientific, Technical and Administrative and Data Services

Geophysical surveys involving seismic, resistivity, gravity, well logging and magnetometer techniques were undertaken to assist in the investigation of ground-water contamination problems, ground-water development projects, hydrogeological investigations for waste disposal sites, geological mapping for construction materials and the location of buried metal containers containing hazardous materials.

Ground-water surveys were undertaken for seven municipalities and nine test-drilling projects were supervised. Well performance tests were conducted for four municipalities. Ground water interference problems were investigated for five municipal projects including the York-Durham project.

A guide for ground-water users, entitled "Water Wells and Ground Water Supplies in Ontario", was released. Included in this public information document is basic information on factors which affect the occurrence, the quantity and quality of ground water, a synopsis on well construction, and a discussion of common problems associated with wells and water-supply systems.

Environmental Impact Assessment

Staff also co-ordinated the Branch's review and provision of technical comments on nine Class EA documents, 25 individual EA documents and advice and guidance on nine pre-submission EA documents. Assessment and advice was also provided on the mitigation of Ontario Hydro activities with potential effect on water resources, such as thermal discharges, impingement of fish, entrainment of larvae, intake and outfall configurations, and emission of contaminants for developments at Pickering, Darlington, Bruce and Nanticoke.

In addition, staff provided an assessment of

marine construction activities such as dredging and dredging disposal; landfilling; river crossings (dredge, pipelines, etc.); underwater construction (intakes, outfalls, electrical cables, etc.); and erosion and sediment control as related to urban construction activities, in the following areas: Keating Channel, Eastern Headland, Sam Smith Landfill, Southeast Bend Cutoff, Haldimand Norfolk Water Treatment System, Darlington G.S. and Wesleyville G.S.

The co-operative association with Environment Canada through the bioassay testing program continues to generate fish toxicity test results on industrial wastes discharged to receiving waters throughout the Province. These are used to enforce the Canada Fisheries Act and address concerns in the Great Lakes identified through the Canada/U.S. Agreement on Great Lakes Water Quality.

Major emphasis has been directed toward assessment of pulp and paper mills in the Thunder Bay area over the last two years.

On-site industrial evaluations in the Cornwall area were completed using continuous biomonitoring techniques with rainbow trout, daphnia (water-flea) and fish eggs. Biological data will be incorporated into hydrological models developed for the St. Lawrence River to identify limited use zones.

Selected industrial waste discharges identified by regional offices are routinely tested and biological toxicity associated with specific compounds is determined. The segregation and identification of toxicants provides direction for regional staff to recommend appropriate effluent treatment thus reducing the biological impact of wastes in receiving waters. Major investigations have been completed in the Elliot Lake area and in Espanola, into gas fracturing in Lake Erie, textile plants in Cambridge and Cornwall, chemical manufacturing at Elmira, zinc derailment in Timmins, into tannery wastes in Acton and Aurora, waste disposal site leachates in Sarnia, air strip derubberizing agents for Transport Canada and an electroplating operation near London.

Preliminary investigations of the toxicity of chlorinated phenols and benzenes have been completed on single and mixtures of compounds. This information has provided guidance to a Lottery project underway at Lakehead University to determine the effects of these compounds on fish reproduction and bioaccumulation. Data will be used to establish scientifically defensible discharge objectives.

Collection of young-of-the-year spottail minnows dating back to 1975 throughout the Great Lakes has continued to indicate general declines in PCB, DDT and mirex as a result of regulatory and voluntary restrictions in use. Young yellow perch data have indicated potential PCB sources of continued release and have allowed regional staff to address problems near the Ganaraska, the Thames River, and have assisted in the development of objectives for restricting PCBs in road oil used for dust suppression.

Cartography and Drafting Services

In servicing the cartographic, drafting, graphic artwork and reproduction needs of the Ministry, Branch staff completed 203 multi-color and mono-color maps and prepared 1,280 drawings, figures and illustrations.

Inland Lakes

Acid Precipitation in Ontario Study

Staff from the Ministry's Inland Lakes Section were deeply involved in the Acidic Precipitation in Ontario Study (APIOS). They continued intensive sampling and analysis of the eight major study lakes near Dorset and their 31 associated watersheds. Programs for intensive work during the period of spring melt were undertaken in conjunction with the University of Toronto. Analysis and workup of data are continuing.

The report entitled "Acid Sensitivity Survey of Lakes in Ontario" was released in March 1981. Information from more than 1500 lakes in 32 Districts and Counties was compiled and analyzed for this report.

The Branch participated in several public relations and lecture activities relating to APIOS and several conferences, meetings and workshops both in Canada and the United States. Considerable effort was devoted to the synthesis of the Work Group I (Aquatic Effects) Report in support of the Canada/U.S. Memorandum of Intent to negotiate controls on long range transport of SO_2 .

The Branch continued to use yellow perch to monitor metal levels in fish from acid stressed lakes. Results are compared to water quality characteristics to identify conditions that contributed to elevated metal levels observed in depressed pH lakes.

Laboratory studies are being completed to determine the levels of aluminum that contribute to mortality in fish embryo-larval life stages during rearing in acidic and other water conditions. Laboratory results will be confirmed in the field during the following year. Additional tests are being completed on mature fish to identify physiological functions that are being affected under acidic conditions.

Another project involved the proposition that acidified ground-water can be corrosive to water distribution plumbing systems and create a potential health hazard by leaching of trace elements into drinking water. Consequently, the Ministry undertook a synoptic survey of ground-water quality in the Canadian Shield area of the Province to determine the range of ground-water pH values, with special emphasis on low values as indicators of ground-water acidification.

The results indicated that there are areas of potential acidification and a preliminary network was established to monitor for seasonal variations.

All the fieldwork for the Sudbury Environmental Study has been completed and reports are now being prepared. The study involved intensive monitoring of seven lakes in the Sudbury area. The acidic control lake, Clearwater Lake, was monitored for seven consecutive years. This represents the world's longest continuous monitoring program on an acidic lake.

Great Lakes Program

The Great Lakes program is a federal/provincial cost-shared surveillance, investigation and assessment program providing the data and information required for defining existing environmental conditions and trends in the nearshore areas and connecting channels of the Great Lakes, and determining cost-effective pollution abatement and prevention measures necessary to restore and maintain water quality in accordance with Provincial objectives and the objectives of the Canada-U.S. Agreement of 1978.

1980 saw a continuation of the trend toward greater stability in water quality conditions throughout the Great Lakes in response to international efforts over the last decade in the abatement of the major sources of pollution. These efforts which have keyed on the problems of nutrient enrichment and nuisance algal growth have produced a levelling off of net algal production across Lakes Erie and Ontario and have given rise to decreased algal production and improvements in algal species composition in portions of both lakes including Lake Erie's western basin, the Bay of Quinte and the Toronto waterfront. These successes in turn have benefitted the user through improved recreational opportunities, greater efficiency in treatment of water for domestic supply, reduced incidence of algal-related taste and odour problems in water supplies and improved fishery habitat.

Ministry surveillance programs along with programs of the other environmental and regulatory agencies around the Great lakes are constantly and rapidly adding to our knowledge of the distribution in the Great lakes environment of many familiar compounds such as mercury, PCBs and DDT as well as of many previously unidentified contaminants. Controls on the manufacture, transport, use and emission of the contaminants of most immediate concern have been implemented across the basin. While the persistence of many of these means that ecosystem recovery will be a gradual process, current information indicates sizeable reductions in body burden levels in fish and other biota.

In addition to these basin-wide achievements, the

success of Ministry pollution abatement efforts are also reflected in improvements at the local level. These include Sault Ste. Marie where reductions have occurred in phenolics and bacteria levels, the Detroit River where municipal controls have reduced bacteria levels, the Toronto waterfront where reductions in nutrient and bacterial levels in the harbour area have occurred and Belleville where a reduction in filter clogging and the incidence of taste and odour in the domestic water supply has been documented.

The following are the highlights of the Ministry's surveillance activities and findings on a lake-by-lake basis. Details of the 1980 surveillance programs can be found in the Canada-Ontario Agreement Review Board Document "Canada-Ontario Surveillance Programs 1980-81".

St. Marys River

Activities focussed on the continued monitoring of construction activity at Great Lakes Power and on development of Control Order requirements for Algoma Steel Corporation.

Cofferdam construction and the resulting alteration to discharge rates and flow pattern had little effect on water quality and did not appear to interfere with existing waste dispersion patterns. Alert levels established by the Lake Superior Board of Control for the protection of area water uses were not exceeded.

Information on river water quality and river dispersion characteristics was used in determining effluent requirements for a new Control Order for Algoma.

Lake Huron

Studies suggest that conditions in the nearshore zone are unchanged from the high quality reported by the Upper Lakes Reference Group in 1976. The sensitivity of Georgian Bay to nutrient inputs which promote nuisance growth of the alga, *Cladophora*, was demonstrated by Branch investigators. This had led to the recommendation of more stringent controls on phosphorus levels in municipal discharges.

St. Clair River

An investigation in the Sarnia Bay area indicated that total and fecal coliform levels often exceeded the provincial objectives for recreational use during the summer. The violations of the objectives are attributed to discharges from storm sewers. Possible remedial action is being investigated. Three additional reports on the St. Clair organic study were completed. Based on the findings of this study, the Ministry is developing programs with industry in the Sarnia area to further reduce organic loadings to the river. Included is a new biological treatment system at Polysar.

Detroit River

A survey of the Detroit River conducted in 1980 revealed an impaired benthic community and high levels of PCBs, mercury and some pesticides originating in the vicinity of the Detroit sewage treatment plant, Great Lakes Steel Company and the Rouge River. Nevertheless, improvements in the biological communities have occurred along both sides of the river since 1968.

Total phosphorus loadings from the Detroit River to Lake Erie have stabilized after a significant decline over a 12-year period from 1967. Further reduction is awaiting completion of treatment facilities serving metropolitan Detroit scheduled for 1981.

Lake Erie

Reports on Lake Erie water quality conditions are under preparation summarizing findings of a two-year international study of the lake in 1978-79.

Total phosphorus levels in nearshore waters of the western basin have declined at a rate of more than three ug/L over the last decade. This improvement has contributed to a decline in algal densities and enhanced treatment efficiency at the Union municipal water plant. Significant improvement in the zoobenthic community was also demonstrated by a comparison of 1979 findings with results from an earlier survey in 1968.

The influence of the Grand River discharge on enrichment in the eastern basin of Lake Erie was assessed and found to be particularly significant during the spring when river discharge affected nutrient levels as far as Port Colborne. *Cladophora* accumulation along the north shore of the basin has decreased in recent years in response to phosphorus controls. Further phosphorus load reduction will be necessary if shoreline recreational use in the extreme eastern section of the lake is to materially benefit. Local studies in several harbour areas indicated degraded water quality at Port Stanley and Wheatley. Some improvement at Wheatley was noted to have occurred in recent years as a result of remedial measures undertaken by Omstead Foods Ltd.

Niagara River

Surface water quality surveys were conducted along fixed ranges in the lower and upper Niagara River during 1980. Water samples were in compliance with drinking water criteria, but at some locations in the lower Niagara River, the objectives for the protection of aquatic life were occasionally exceeded for some heavy metals, several organochlorine pesticides, phenols, total coliform bacteria and total phosphorus. Concentrations of aluminum, iron, mercury, total phosphorus, nitrate and nitrite, ammonia, total Kjeldahl nitrogen, and fecal coliform bacteria exceeded objectives on the U.S. side of the

upper Niagara River (Tonawanda Channel) reflecting the numerous sources in this heavily developed area.

Biomonitoring of trace contaminants (e.g. PCBs and organochlorine pesticides) using caged freshwater clams was initiated in the Niagara River and proved successful in the identification of source areas.

Lake Ontario

While phosphorus levels in nearshore waters of Lake Ontario have declined dramatically since they reached their peak in the late 1960s, they appear to have stabilized in the last four years. Additional phosphorus controls are being implemented in the Lake Ontario basin as they are in the Lake Erie basin and it is expected that levels will resume a downward trend. The International Joint Commission is considering a target level of 10 µg/L of total phosphorus as necessary to achieve and maintain acceptable water quality.

1980 was the final field season on Hamilton Harbour. Summary reports on the findings are being prepared. The development of statistical and block water quality models, linking loadings to the harbour with oxygen depletion is continuing. Investigations of the processes affecting oxygen levels suggest that the main sinks for oxygen are the bacterial oxidation within the water column, of organic carbon and of reduced sulphur and nitrogen compounds.

A study of the behaviour of the thermal plume from the Pickering Nuclear Generating Station during the winter months was carried out in co-operation with Ontario Hydro and the National Water Research Institute. The thermal plumes generally follow the coast and are narrow—around one km in width. Depending upon currents, temperature rise may be detected five to 10 km from the station. The easterly plumes are about twice as frequent as westerly ones.

Controls on municipal inputs of phosphorus have resulted in reduction of as much as 40 per cent in phosphorus and chlorophyll (a measure of algal biomass) levels in the upper portion of the Bay of Quinte. User benefits were evident at the Belleville water treatment plant where microstrainers used to filter out the algae were in operation for only a few weeks in 1980 in contrast to the 4-5 month/year operation needed in earlier years. Lower algal biomass and changing species composition have also led to a marked decrease in the incidence of taste and odour problems in the treated water.

Dissolved oxygen concentrations continued to be low (1-2 mg/L) in the Adolphus Reach outlet of the Bay of Quinte during the late summer (August). No change has been observed in the oxygen status in that region since the late 1960s when observations began. It would appear that phosphorus abatement measures thus far have had little impact on the oxygen regime in this area and that oxygen concentrations are influenced by the deepness of the channel. Dissolved oxygen concentrations in the bottom waters of the

Eastern Basin of Lake Ontario were also low in late August in the area south of Amherst Island as far as Pigeon Island. Surface waters in the area were however well above the six mg/L objective set out for the protection of aquatic life.

Toronto Waterfront

Data collected during recent years indicate that swimming beaches on the Toronto waterfront are in compliance with the Provincial Objectives for the protection of body contact recreation areas. Several areas along the waterfront nevertheless exceed the bacteriological objectives. These areas are largely confined to locations receiving sewage treatment plant discharges and storm and combined sewer overflows. A declining trend in coliform densities has been noted in these areas over the last few years reflecting improvements made to the sewer system, the construction of the new York-Durham sewage network and treatment plant and the elimination of several sewage treatment plants previously discharging to the Don River. One of the remaining non-compliance areas is Ashbridges Bay which receives both storm overflows as well as main sewage treatment plant seagate discharges. An inter-agency study is underway in an attempt to define the relative significance of these inputs into the area and to assess the effectiveness of several remedial measures including a new main sewage treatment plant outfall.

Total phosphorus concentrations in the inner and outer harbours continue to exceed the provincial guideline of 20 µg/L for the protection of Great Lakes waters. In spite of these high phosphorus levels, total algal biomass, as reflected by chlorophyll a measurements, has not reached nuisance proportions in the harbour areas. The absence of algal blooms can be accounted for by elevated harbour and nearshore turbidity levels which limit the available light.

Several of the provincial guidelines for open water dredged spoils disposal are exceeded in the sediment quality throughout the waterfront area. Among these are PCB's, mercury, lead and organic content. Heaviest contamination is found in the Keating Channel at the mouth of the Don River, in the Inner Harbour boat slips and in portions of Humber Bay. Contaminated spoils are disposed of in a confined basin on the outer face of the Eastern Headland.

An intensive study was conducted in 1980 to determine the effects of dredge spoil disposal from Toronto Harbour at Keating Channel and landfilling at the Headland on the water quality in the Toronto waterfront. The data suggest that the dredge disposal and landfill construction activities at the Eastern Headland have not adversely affected water quality in the nearby areas. Turbidity plumes recorded east of the Headland appear to originate from active landfill activity and erosion processes acting on the existing landform. The observed turbidity levels did not, however, reach levels of concern to either the Island or R.C. Harris drinking water supplies or to aquatic life.

St. Lawrence River

Investigations of bacterial contamination in and downstream of the Cornwall area led to recommendations on improvements to the municipal sewage collection system and expansion of the sewage treatment plant at Cornwall. The necessary works are tentatively scheduled for completion by 1985.

Investigations of PCB sources across the river in Massena, New York by the New York Department of Environmental Conservation confirmed the 1979 findings of the Ministry. Remedial action has been initiated at the three local industrial plants to reduce or eliminate the PCB emissions.

Basin Wide Activities

The Branch continued to provide support to International Joint Commission activities under the Great Lakes Water Quality Agreement of 1978 as well as providing information on water quality trends, on areas where water quality did not meet Agreement objectives, on emerging problems and on waste inputs. Branch staff served on several committees involved with the planning of and reporting on international surveillance activities and on the formulation and review of water quality objectives.

A major advancement in developing closer links between waste inputs and their water quality impacts was made during 1980 with the application of predictive modelling to the determination of mixing zones for new expanded waste discharges. This approach was used in determining appropriate outfall location, outfall design and effluent requirements for municipal and industrial treatment facilities at Sault Ste. Marie, Gore Bay, Sarnia, Wheatley, Pt. Burwell and Cornwall. Estimation of mixing zones for many existing discharges were also developed for later verification with actual field measurements.

Young-of-the-year spottail shiners continued to be useful indications of tributary source areas and trends in input levels of persistent organic substances. Since sampling began in 1975 fish from all nine monitoring locations in Lakes Erie and Ontario have shown declines in body levels of PCB and DDT.

Pollution Control Branch

Director: K.E. Symons

The Pollution Control Branch is primarily responsible for the planning of environmental control programs and development of associated policy legislation, regulations and guidelines to control the emission of contaminants and the quality of drinking water. Other functions include applied research, technology transfer, technical advisory services and delivery of certain aspects of the pesticides and noise control programs.

Municipal and Private

The Municipal and Private Section has responsibility for controls governing communal water supplies and municipal and private wastewater treatment systems. To this end, staff assess the effectiveness of existing programs and review the need for policy revision or the development of new policies.

Activities included administering a \$52 million federal grants program provided to assist in the construction of municipal water and sewage services under the Community Services Contribution Program, since terminated by the Federal Government. Continued co-ordination of this program within the Ministry and liaison with the federal government and other participating provincial ministries, was provided.

Draft policy and guideline statements were prepared governing the use of marshlands for the upgrading of sewage works effluents, the management of urban drainage and the dewatering and stabilization requirements of municipal sewage sludge prior to its utilization and disposal. Interim guidelines for compost quality, production and end-use were also prepared.

Monitoring and evaluation of phosphorus removal at wastewater treatment plants was continued and assistance was provided to Ministry staff in implementing the program. In 1980, 222 wastewater treatment plants with phosphorus removal facilities removed an estimated 7000 tonnes of phosphorus which would otherwise have been discharged to our lakes and rivers.

A status report on the pollution abatement efforts of Great Lakes municipalities was forwarded to the International Joint Commissions (I.J.C.) for inclusion in the I.J.C. Water Quality Board Annual Report.

Implementation of the Guidelines for Utilization of Sewage Sludge on Agricultural Lands successfully moved into the second year of its three-year phase-in period. Municipalities are now spreading acceptable sludges in accordance with the Guidelines provisions, while unacceptable sludges are temporarily being spread at reduced rates. Corrective measures, brought into effect by municipalities, will ensure maximum

agricultural utilization of sludges with minimum risk to health, the environment and crop production. Implementation of the program is being co-ordinated jointly by the Ministry of Agriculture and Food and the Ministry of the Environment

Seven notices were prepared and distributed to those responsible for administering the private sewage program under Part VII of the Environmental Protection Act. These notices are intended to keep the Ministry of Health, Health Unit and Ministry personnel up-to-date regarding technical, financial and legal aspects governing private sewage systems.

In excess of 40 firms were certified during the year to manufacture septic tanks and sewage holding tanks. Certification is required by Regulation.

Drafting of the Revised Ontario Drinking Water Objectives was largely completed. The Ministry of Health, the Ministry of Labour, the Ontario Municipal Water Association, the American Water Works Association (Ontario Section) and The Municipal Engineers Association participated in the preparation of the document.

The Revised Chlorination Bulletin was distributed to water works managers, treatment plant personnel, Medical Officers of Health, Ministry field staff and consulting engineers. About 2,500 copies were distributed.

A proposed Ozonation Standard was prepared for the Ten States Standards Water Committee for inclusion in the forthcoming revision of the Ten State Standards for Water Treatment.

Noise Pollution Control

Seventy municipalities have now adopted a noise control bylaw under Section 95a of the Environmental Protection Act for the control of nuisance noises in their communities. Of these, three have adopted the comprehensive bylaw while 62 have adopted a simpler format and four rural areas have adopted a special purpose bylaw designed to control animal noise in the community.

Two noise prosecutions were launched under Section 14 (1) of the Act by external groups and Provincial Officers were called upon to provide expert testimony in one of the actions.

The draft Official Plans for Mississauga and Brampton in the Region of Peel were reviewed. A major concern in these communities is the impact of aircraft noise on residents. The City of Mississauga and the Ministry also co-operated in resolving several other land use issues:

- Planning for the new Highway 403 noise

barriers;

- Analysis of noise impacts of planned CN Bramport Intermodal Terminal;
- Joint study with CN Rail into rail noise impacts on housing located to the south of the new Bramport Terminal;
- Analysis of noise impacts resulting from operations at Reid Milling Limited in Streetsville.

Three situations involving complaints made to Ministry and to the Ombudsman were investigated.

The Section continued to provide technical comment on new land use proposals and new industrial and commercial projects as provided for under the legislation. More than 2,500 projects have been assessed for noise impacts since the Ministry was reorganized in 1974.

The Ministry has conducted the final series of noise control training courses under the original format. Over 800 trainee-weeks of instruction have been provided since 1975 to provincial and municipal employees and to the private sector. The Canadian Acoustical Association has agreed to co-sponsor future noise control training courses designed to accommodate changing needs.

Pesticides Control

During 1980-81, the Pesticides Control Section held 2,221 examinations and issued 6,880 exterminator, 1,028 operator, and 3,664 vendor licences. The Section also issued 190 permits for the use of restricted products on land, 477 permits for the application of pesticides to water, and 194 permits for structural extermination.

Under the termite control program, new infestations were discovered near Malden Centre, Colchester and Lakeview Beach, in Essex County, and in Elmira and Oakville. Termite control agreements were established with the Town of Dresden and the Borough of York.

The following is a list of municipalities with which agreements have been concluded and of grants approved for chemical treatments and structural alterations required for the control of termites:

MUNICIPALITIES	GRANTS
City of Toronto	247
Borough of York	8
Borough of East York	48
City of North York	1
Borough of Scarborough	24
Village of Elora	15
Town of Markham	1
Town of Fergus	1
Town of Leamington	88
Town of Kincardine	22
Borough of Etobicoke	6

Altogether 461 treatments were carried out for which grants totalled \$250,000.

Contingency Planning

The Contingency Planning Section updated and reprinted the Province of Ontario Contingency Plan for Spills of Oil and Other Hazardous Materials. The contingency plan organizes the activities of various provincial and federal government agencies, which may be involved in the response to spill incidents of major proportions in the event that the response by the party responsible for the spill is inadequate.

During 1980-81, the section received spill reports on 552 incidents. Of these, 324 involved the loss of oil, 84 involved the loss of liquid and solid hazardous materials; 18 gaseous materials and 96 other environmental contaminants.

Research and Development

The Co-ordination and Technology Transfer Section is responsible for internal and external research co-ordination and liaison and for administration of the research facility.

The Supervisor is Chairman of the Ministry's Research Advisory Committee, which is responsible for the co-ordination of research and development throughout the Ministry. The Committee also administers the Provincial Lottery Fund. During this year, 27 health-related environmental projects were funded at a cost of \$1.8 million.

Project subjects included removal of organic contaminants from drinking water, effects of air pollutants on children's health, atmospheric deposition of mercury and mutagenic activity of PAHs.

During the year, liaison was maintained with the United States Environmental Protection Agency, particularly, its drinking and wastewater research groups in Cincinnati, Ohio, and with Ministry counterparts in the Federal Government.

Applied Sciences

The Applied Sciences Section is an engineering group, which carries out and reports on studies of innovative concepts relating primarily to municipal servicing for Northern communities and private waste systems for non-sewered development.

During 1980-81 two reports were prepared on the basis of studies of groundwater in and near tile beds.

Section staff have provided an increasing amount of technical advice and field service to commercial establishments and resorts on the design, approval

and construction of large subsurface sewage disposal systems and to both the public and private sectors on the design and construction of pipelines.

Wastewater Treatment

The work of the Wastewater Treatment Section is directed towards advancing the quality of treatment and control of urban wastewater discharges and providing technical support and expertise in the formulation of related guidelines, policies and programs.

The section maintains an analytical laboratory for special analyses and the Ontario Experimental Facility, a 5.0 MIGD activated sludge plant, for use in developmental research work and operator training.

At year-end, the section was involved in a total of seven research projects.

Staff also provided advice to some 21 municipalities throughout the province on various aspects of wastewater treatment. Assistance was provided to 18 industries on specific waste treatment problems.

Section staff also participated in the development of several policies including those relating to urban drainage control, combined sewer overflows, effluent disinfection, sludge composting, and minimum sewage treatment requirements.

Water Technology

The Water Technology Section conducted research concerning oxone, trace organics (including trihalomethanes (haloforms)), trace contaminants in water treatment chemicals, iron and manganese treatment, asbestos, the effect of treatment processes on treated water quality, distribution systems, and macro/micro-biological water quality.

Staff provided technical consultation on new water supply treatability studies, raw water plant commissioning, plant up-rating and plant operational and technical problems, including the advanced treatment necessary for trace contaminant control or removal.

Environmental Approvals Branch

Director: T.W. Cross

The Environmental Approvals Branch provides an approvals function for companies, individuals and government agencies requiring approval for their projects under the Environmental Assessment Act and sections of the Environmental Protection Act and Ontario Water Resources Act.

Municipal & Private Approvals

The Water & Wastewater Approvals Unit reviews applications for approval for water and sewage works under Section 41 and 42 of the O.W.R. Act.

APPLICATIONS FOR APPROVAL FOR WATER AND SEWAGE WORKS

Municipal & Private Applications Received		Provincial Applications Received	
Water	Sewage	Water	Sewage
916	1432	41	74
Applications Approved		Applications Approved	
Water	Sewage	Water	Sewage
940*	1473*	43*	77*
Applications Cancelled		Applications Cancelled	
72		0	

*Applications carried over from 1980.

Total Cost of Applications Approved		Total Cost of Applications Approved	
Water	\$28,440,505.60	Water	\$195,985,274.03
Sewage	\$95,041,275.00	Sewage	\$378,992,725.06
Total Cost of Water and Sewage		Total Cost of Water and Sewage	
\$123,481,780.60		\$574,977,999.09	

The processing of these applications is aided by the Ministry's transfer program for technical review which has been favourably accepted by the Regional Municipalities and is intended to be extended to

others. Under this program, municipal engineering staff review routine water and wastewater applications against MOE guidelines and make recommendations directly to the Director of the Environmental Approvals Branch.

In 1980-81 the program was extended to include the City of Chatham.

The Waste Management Approvals Unit administers Part V, Section 33 of the Environmental Protection Act for the approval of waste disposal sites and waste management systems.

In 1980-81 the Unit re-issued approximately 840 applications for waste disposal sites and 504 applications for waste management systems.

There is still a trend to replace smaller inadequate sites for larger regional ones. The unit received 17 new applications for waste disposal sites of which 13 were issued certificates of approval. During the 1980-81 fiscal year 15 sites were entered for hearings; seven proceeded to the Environmental Assessment Board. In the same period three appeals were requested, two of which were withdrawn. At year-end 1,547 active waste disposal sites were licensed by this Ministry.

The Unit issued 373 licenses for septic tank haulers and 91 for waste haulers. As of March 31, 1981, 3,483 licenses for septic tank haulers and installers had been issued.

Industrial Approvals

The Industrial Approvals Section processes industrial applications for approval of treatment and control facilities for contaminant discharges into the natural environment.

It also provides technical expertise and advice on industrial pollution control technology to branch and regional staff, industry and Regulatory Agencies of other provinces.

Applications received and processed in 1980-81 are summarized below:

APPLICATIONS PROCESSED From April 1, 1980 To March 31, 1981				
	Received	Approved	Cancelled	Denied
Air	1063	969	89	5
Water	103	75	18	0
Waste	23	26	11	0
Total	1189	1070	118	5

"Applications received" show an increase of 15 per cent over the previous year.

Staff provided input on the implementation of the sulphur dioxide alert system in the Sarnia area during a large upsurge in industrial expansion. Plans have been finalized and construction started on projects totalling \$1.8 billion over the next three to five years.

Environmental Assessment

The Environmental Assessment Section is responsible for administering the Environmental Assessment Act, which provides for a decision to approve or not approve an undertaking which is subject to the Act, based upon an examination of the environmental effects of the undertaking and alternatives.

During the year, the Section continued to review formal environmental assessment submissions of Provincial Ministries and Government Agencies, including the Conservation Authorities. On June 3, 1980, the Act was extended to the Municipal Sector to take effect in January 1982. Section staff carried out more than 40 information sessions for Municipal representatives on the Environmental Assessment Act at various locations across the Province. A major seminar was held with a large cross section of Municipal representatives in February, 1981. In addition, the Section is continuing its analysis of applying the Act to the private sector.

As some undertakings might be subject to more than one hearing before more than one board under such acts as the Environmental Assessment Act, the Environmental Protection Act, the Planning Act, the Expropriation Act, the section prepared a Bill for the general "streamlining" of government approvals processes.

During the year, 22 reviews were completed and published on undertakings for which environmental assessments were submitted. Twelve undertakings were given approval to proceed, subject to conditions. In all of these cases, the initial assessment and review process resolved all areas of concern so that public hearings were neither requested nor required. Twenty formal submissions, six resubmissions and nine draft submissions were received on undertakings for approval under the Environmental Assessment Act.

Four undertakings were referred to the Environmental Assessment Board for public hearings, at the request of the public and the first two hearings of the Board under the Environmental Assessment Act were completed.

Land Use Co-ordination

The Land Use Co-ordination Section advises other government agencies at all levels and the private sector on environmental matters related to land use planning. It co-ordinates the Ministry's responses to regional development strategies, regional municipality official plans and other proposed land use changes to ensure that all environmental aspects are considered. It initiates or carries out studies on environmental matters affecting land use, including the development of Ministry policies on land use.

In 1980-81 the Section provided advice and assistance to the regional municipalities in the Toronto centred region in the implementation of their official plans. It also reviewed 28 documents submitted under the Environmental Assessment Act. Studies were carried out on: remote sensing, monitoring the effectiveness of the plan review program; buffers and land use compatibility, wetlands policy.

The Section co-ordinated the Ministry's appearance at the Ontario Municipal Board hearing regarding the 3 km buffer around major industry in the Region of Haldimand-Norfolk.

Staff assisted the Niagara Escarpment Commission. Staff and the hearing officers at public hearings on the proposed plan for the Niagara Escarpment as well as representing the Ministry on a variety of other committees and task forces.

Forty exemptions were granted under Section 30 of the Environmental Assessment Act during the year.

Staff pre-consulted on approximately 20 projects with Provincial Ministries and Agencies.

Section staff continued to hold seminars and lectures on the Environmental Assessment Act and in particular co-ordinated a course on witness training for staff participants involved in hearings under the Environmental Assessment Act.

Project Co-ordination Branch

Director: J.C.F. MacDonald

The Project Co-ordination Branch has prime responsibility for managing, co-ordinating and reviewing all Ministry capital sewage and water projects from inception to the completion of construction.

During 1980-81, the branch handled 211 construction contracts and administered a capital expenditure of approximately \$123.6 million. Of this amount, 36.9 per cent was paid out as subsidies under the Ministry's construction program for municipalities. In addition, the branch is responsible for the administration and budgeting of the Ministry's:

- direct grant program for providing grants to assist the construction of municipally-owned water and sewage facilities (1980-81 expenditure \$33.2 million);
- grant program to assist the construction of major water and sewage works in regional and restructured municipalities (1980-81 expenditure \$8.2 million);
- grant program for low-cost alternatives to communal systems in small communities (1980-81 expenditure \$3.2 million).

Project Management

The Project Management Section is responsible for the development and management of the Ministry's capital works program within the Ministry's six regions, excluding the York-Durham area scheme. The Section administers the Ministry's Direct Grant Programs, including the development of budgets and the managing of cash flow, and provides project management services, when requested, on certain direct grant projects for small municipalities lacking resources or expertise for handling their own sewage or water works projects. The Section is frequently the delivery arm for other Ministries such as Northern Affairs, Treasury and Economics, Industry and Tourism, Housing and Intergovernmental Affairs in implementing sewage and water programs, particularly where such programs are carried out as provincial priorities.

Since March 1979, the Section has administered the expenditures under the Community Services Contribution Program (CSCP), which replaced the former Canada Mortgage and Housing Corporation (CMHC) infrastructure assistance program. CSCP grants totalling \$51.6 million, including \$30.1 million for Ministry-financed projects, were committed for payment in 1981-82 (see appendices). In December

1980, the Federal Government announced the termination of the CSCP.

Projects in Northern Ontario continued to receive financial assistance from the Ministry of Northern Affairs to accelerate infrastructure development. Approximately \$4 million was provided by Northern Affairs for direct administration by the Branch in assisting 35 such projects.

Close liaison continued with the Ministry of Northern Affairs to assist in the development of that Ministry's programs in future years and the Ministry of the Environment's programs for sewage works and water works.

Two subsidy agreements under the General Development Agreement of the DREE/RPB (Department of Regional Economic Expansion/Regional Priority Budget) programs continued to be administered by management committees, which include representatives from DREE, the Ministry of Northern Affairs and the Ministry of Intergovernmental Affairs and the Branch's project manager for the particular region. The Northwestern Management Committee administers a \$50.8 million program that includes sewage improvements in Thunder Bay and Ignace. The Northeastern Management Committee administers a \$30.0 million program that includes services for industrial parks in Parry Sound, Sudbury and North Bay, as well as infrastructure in Timmins. The DREE/RPB program also included expenditures for infrastructure projects for single industry resource communities such as Nakina, Longlac, Geraldton, White River and Hornepayne.

Projects funded jointly by the Ministries of Northern Affairs and Environment have proven to be effective not only in terms of the MOE's objectives, such as pollution control, but also as a means of implementing the broader provincial objectives of improving the infrastructure necessary for growth and development.

In the West Central Region, construction continued on the Haldimand-Norfolk Provincial Area Water Supply System. The trunk watermain to the new community of Townsend was completed on schedule to meet the Ministry of Housing's requirement for water supply by September 1980.

In the Central Region, design and construction continued on the \$40 million sewage works and water works program for the community of Keswick in the Township of Georgina. By the end of March 1981, seven contracts with a total value of about \$9.2 million had been awarded.

Construction continued on the \$16 million Wasaga Beach sewage works and water works program with funding provided through the Ministry of Natural Resources. The \$3.1 million sewage treatment plant was completed in November 1980.

York-Durham Projects

In April/May 1980, five existing sewage treatment plants were taken out of operation and flows were directed to the new plant at Duffin Creek.

Additional facilities were added to the York Water System in Woodbridge and Markham and design and construction commenced on the remaining pipelines in these two areas and in Richmond Hill.

During the fiscal year 1980-81 over \$27 million was spent on the sewage system and about \$5 million on the water system.

Design and Equipment Review

The Design and Equipment Section reviews and evaluates for approval purposes, design submissions received from consulting engineers for all sewage and water projects where contracts are to be awarded or managed by the Ministry. The submissions are evaluated from the viewpoints of sanitary, mechanical and electrical engineering and cost effectiveness, including energy utilization and conservation.

The Section processed approximately 149 submissions including major sewage and water projects in South Peel Region, York-Durham Area and Haldimand-Norfolk Region. In addition, the Section was involved in the preparation of design guidelines and standard specifications for equipment.

Ground Water Development

The Ground Water Development Section supervised four test drilling and two well construction contracts with a total value of \$129,000. The Section also undertook two formal ground-water surveys and numerous special investigations involving well testing and analysis of well and aquifer performance for Ministry projects. The Section was also extensively involved in the investigation and resolution of well water interference complaints arising from contractors' dewatering activities in four water and sewage construction programs. In addition, the Section reviewed reports on low cost alternative proposal schemes and on proposals, engineering drawings, hydrogeologic reports, involving well-water programs and ground-water problems.

Project Control

The Project Control Section co-ordinates the compilation of data and the preparation of schedules

relating to anticipated expenditures and cash flow for Ministry sewage and water works programs. The Section monitors and records commitments and expenditures and advises on the scheduling of contracts to meet budgetary requirements. Various statistics on costs are compiled as required.

(See Tables 1 and 2 at the end of this section and Graphs I to IV in appendices).

Claims and Contracts

The Claims and Contracts Section handles disputed claims for payment made by contractors, third parties etc. in relation to projects financed or managed by the Ministry and assists in arbitration or litigation arising from such claims. The Section investigates technical and contractual bases for claims and reviews matters with consulting engineers and expert witnesses.

The Section receives tenders, reports on tenderers' financial statements to senior management, carries out documentation related to the awarding of contracts and arranges for the execution of agreements.

The Section receives Notice of Claim under the Mechanics' Lien Act, maintains a Register of Claims, provides the basis for the Crown's defence in any Mechanics' Lien trial and assists in the resolution of lien claims whenever possible.

During 1980-81 there were nine disputes in active litigation, two in arbitration and approximately a dozen others were dealt with at an administrative level.

Special Activities

The Special Activities Unit provides special inspection of construction, investigation of unusual construction problems, administration of the Ministry's prequalification system for concrete sewer pipe plants, representation on committees involving standardization, metrication and co-ordination and other administrative and support activities.

The Unit carried out approximately 90 field inspections of Ministry sewer and water works projects during the year. These inspections were principally at substantial completion but included inspections during construction and at the end of the one year's period of maintenance. In addition, approximately 20 man-days were spent on the investigation and resolution of special construction problems.

The Construction Inspectors' Courses (Nos. 1 and 2), sponsored jointly by the Ministry and the

Municipal Engineers' Association, were again held. Approximately 55 candidates from municipalities and consulting engineering companies attended each of the one week courses.

Staff spent considerable time through the year on the review and drafting of standards and specifications and in the evaluation of new products proposed for incorporation into Ministry works.

Field Services

The Field Services Section includes specialists in mechanical and instrumentation equipment fields and provides technical advice and skills with respect to new and operational sewage and water works installations. These activities cover the design, construction and maintenance phases of Ministry projects.

In addition, the Section provides emergency service as required and carries out maintenance audit inspections of operational plants.

About 67 per cent of staff time was spent on the capital works program and 33 per cent on operational installations.

TABLE I
PROJECT CO-ORDINATION BRANCH
Volume of activity under Capital Construction Program during 1980-81.

1. Capital Expenditure		\$123,646,506
Sewage Works		101,910,586
Water Works		21,735,920
Provincial Projects		121,737,675
Municipal Projects		1,908,831
Provincial Subsidy		45,617,086
% of total expenditure		36.9%
2. Construction—Ministry Projects		
Contracts Tendered	— No.	104
	Value	\$110,163,935
Contracts Started	— No.	97
	Value	\$100,936,987
Contracts Completed	— No.	113
	Value	\$114,257,000
Contracts Under Construction		
During the Year		219
Average Number of Contracts Under		
Construction in each month		106
3. Construction—Project Management (Direct Grant)		
Contracts Tendered	— No.	7
	Value	\$ 3,898,595
Contracts Started	— No.	7
	Value	\$ 3,898,595

TABLE II
PROJECT CO-ORDINATION BRANCH
Grants to municipalities for sewage works and water works during 1980-81.

1. MBR priority evaluations		
(1) Direct Grant Program requests	37	
Ruled eligible	24	
Rejected	13	
(2) Private Systems Program requests	32	Total
Ruled eligible	25	evaluated
Rejected	7	69
2. Direct Grant Program payments		\$33,189,946
(15% to 75% grants)		
3. Private Systems Grant Program payments		\$ 3,247,786
(75% grants)		
4. Grants to Regional and Restructured		
municipalities (15% grants)		\$ 8,200,000
5. Federal CSCP Grant commitments for		
payment in 1981-82 (administered by MOE)		\$51,600,000

Waste Management Branch

Director: C.J. Macfarlane

Experimental Plant for Resource Recovery

The transfer station section of the plant was in full operation on 127 of the 251 operating days this year. A total of 124 days of production were lost, 69 days due to a strike by employees of Browning-Ferris Industries, the contract operator, and 55 days due to major damage and repairs to the receiving floor. Modifications were made to conveyors and compactors during the period of floor repairs to reduce operating downtime from recurring mechanical problems resulting from the handling of commercial-industrial wastes.

The resource recovery facilities were in routine operation on 113 of the 251 operating days. Downtime resulted from the strike previously noted; in addition, 61 days were lost because of the damage and repairs to the receiving floor, one day of scheduled downtime for repairs and seven days of unscheduled downtime due to equipment problems and repairs. Modifications were made during the period of the receiving floor repairs. A significant improvement was evident when plant operations resumed in March 1981.

The production goal of 200 tonnes per day was achieved or exceeded on 23 days during the year. A new production maximum of 263 tonnes was established.

The composting facilities were processing to the system's design throughout and producing a saleable product.

The installation of a burner to remove contaminants from the ferrous product was completed in September 1980. The unit is effective in improving the product appearance, a key factor in its marketability.

The Experimental Plant continues to be a source of information for government officials, consultants, schools, and the general public interested in resource recovery as a solid waste management alternative. Guided plant tours were conducted for 784 visitors during the year.

Marketing and Development

During the year a total of 935 tonnes of ferrous metal was sold. The major consumer was LASCO (Lake Ontario Steel Co.), buying 822 tonnes in its "shredded" or as-is form from the plant. Some ferrous metal was further processed into densified bales and sold to both General Motors (102 tonnes) and Brown & Boggs Foundry and Machine Co. (11 tonnes).

Ferrous usage also was demonstrated in several other small iron foundries.

Although the major market development for the light fraction or refuse-derived fuel (RDF) from the plant is the cement industry, as a source of energy, other potential uses are being investigated.

The Brampton Brick Co., with Ministry funding, is investigating the addition of the mulched light fraction to their brick mixture as a burn out fuel in clay brick manufacture and secondly as a major ingredient of fire logs where the light fraction would replace wood chips. Some light fraction was further shredded into a finer material called "mulch" for use as a component part of the "hydro seeding" process. Several other companies have also been asked to evaluate this product.

There was a test burn of the RDF at Canada Cement La Farge in Woodstock from April 7 to April 25, 1980. Most of this firing was carried out at a substitution rate of 18% of the kiln energy requirement. A short run of 27% RDF substitution was also conducted. The cement quality during the burn was acceptable.

The Branch has both sold and provided compost from the plant for demonstration and/or evaluation to over 10 other potential users. The on-going marketing activities of the Resource Recovery Unit are geared toward the maximization of material and/or energy recovery from solid waste. This should enhance the concept of total recycling as far as the public is concerned and guide municipalities with their waste management recycling policies. Specific projects of material/energy recovery are designed to establish the usefulness and price of such products in a supply/demand marketplace.

Source Separation

Project Paper Recycling is in its second year of operation. During the first year, 217 tonnes were sold and the second year will probably yield slightly more.

Seventeen government buildings in Metro Toronto and approximately 8,000 employees were involved in recovering fine office paper. The program will be extended.

Project Paper Recycle had a gross revenue of \$25,000 for the first year and removed from the solid waste stream 217 tonnes of paper all of which will be recycled back into useable bond paper.

Waste Management Studies

Three studies initiated previously were still underway in the fiscal year 1980-81 in the District Municipality of Muskoka (pop. 36,748), the North

Shore Township of the District of Algoma (pop. 1989), and the Towns of Midland and Penetanguishene and the Townships of Tay and Tiny in the County of Simcoe (pop. 30,160). One study was initiated early in the fiscal year 1980-81 for the Regional Municipality of Haldimand-Norfolk (pop. 87,544).

A 20 year waste management master plan for Metropolitan Toronto was completed using a computer model developed for the Ministry. The plan was accepted by Metro and is being used to determine such things as the dates for phasing out obsolete facilities and bringing new facilities onstream.

The Waste Management Improvement Program

In 1980-81 there were 118 contracts with municipalities to upgrade their waste disposal sites for a total cost of \$459,000.

Site Identification Study

In 1980, the Ministry contracted with York University, Lakehead University, and Laurentian University, to identify abandoned waste disposal sites. Graduate research students researching archives, etc. identified approximately 1450 sites. Of these, 197 were selected for further study on the basis of proximity to development and waste type.

Consultants were hired to investigate the 197 sites scattered throughout six regions. Their studies continued through early 1981. Municipalities were notified of their responsibility for remedial action. Long term monitoring will also take place.

Greenhouse Heating Study

The St. Thomas heating study was continued for a second year by Conestoga-Rovers of Waterloo. It was co-funded by the Ministry and Environment Canada for \$36,000 and \$12,000 respectively. Primarily, the study is looking at the long term feasibility of heating a greenhouse with landfill generated methane gas.

Disposal of Liquid Wastes

The Province has established the Ontario Waste Management Corporation to address the major

problem of liquid industrial and hazardous waste treatment and disposal.

The Corporation is responsible for the development, including location, management, and operation of such treatment facilities. Public hearings will be held by a special hearing panel to determine the safety and suitability of the proposed site for this works, and will also be required for the facility.

The Ministry's role in the management of these wastes is to provide complete generator to disposal monitoring as well as an enforcement system. Some of the efforts being undertaken in establishing such a system include:

- 1) Preparation of a regulation covering generators of liquid industrial and hazardous wastes, including responsibilities for waste registration, waybill compliance, and knowledge of ultimate disposal practices;
- 2) Revision of the present Regulation 926 to increase generator and carrier responsibilities and provide increased monitoring of the movement and disposal of these wastes;
- 3) Preparation of vehicle standards and driver training requirements for carriers of liquid industrial and hazardous wastes, developed in conjunction with present legislative efforts in the transportation of dangerous goods area; and,
- 4) Provision of a technique for assessing proper disposal options for liquid industrial and hazardous wastes.

Transfers of Liquid Industrial Wastes

The waybill system of monitoring the movement and disposal of liquid industrial wastes was automated with the program meeting expectations. However, because of the significant additional demands resulting from the program of generator registration, inclusion of hazardous solid waste, and increased information demands of the waybill monitoring system, development work is being carried out on a data processing system of increased scope and capability.

Radioactivity

Staff continued to work on effluent guidelines and low-level radioactive waste disposal.

Investigations were conducted on the leachability of certain low-level radioactive wastes to determine the best means of their disposal.

In addition, unusual levels of radioactivity contamination at Port Hope were investigated.

PCB Handling and Disposal

The Waste Management Branch has been studying methods of efficiently destroying PCBs in an environmentally acceptable manner. The Branch has produced a draft regulation designating PCBs as a waste material and permitting owners of such material who comply with certain pre-conditions to establish storage sites for the wastes on their own property.

Monitoring briefs have been maintained on several independent ventures into PCB destruction processes. These include the use of a diesel engine (D & D, Smithville), chemical processes (Goodyear, Sunohio, Rockwell, etc.) and other innovative techniques (Pyro-Magnetics).

regional operations and laboratories division

Assistant Deputy Minister: W. Bidell

The Regional Operations and Laboratories Division provides a wide range of services including: environmental protection, abatement programs and complaint investigations; environmental assessment; and the operation and management by Ministry staff of water and sewage works systems constructed by the Ministry.

In addition, the Division provides analytical and research support to the Ministry through the operation of provincial and regional environmental laboratories.

Northwestern Region

Director: R.M. Gotts

Industrial Abatement

Four Control Orders were issued in 1980-81, requiring water pollution abatement with three also requiring air emission abatement.

The companies concerned anticipate spending approximately \$50 million in the completion of these Control Orders.

During 1980-81, Regional staff investigated 25 spills and 155 complaints.

Routine inspections dealt primarily with the pulp and paper industry, the mining industry and audits of effluents and emissions from other industries in the Region.

In 1980-81, Environment Canada supplied a mobile toxicity testing laboratory to the Region and extensive toxicity tests were carried out on effluent samples from all the pulp and paper companies and operating mines plus selective industries. Results of these studies will lead to new requirements in the Control Orders now being prepared and will indicate if improvements have been achieved. The survey will be continued in 1981-82.

In October 1980, Region staff dealt with a transformer malfunction at a public school in the City of Thunder Bay, which resulted in a spill of PCBs in the immediate area where the transformer was housed. Staff supervised the clean-up procedure by Thunder Bay Hydro and undertook extensive monitoring of ambient air and soil, and air within the classrooms of the school. Approximately 350 drums of contaminated soil were removed from the site.

Control Orders, which have been served or are being served on all the pulp and paper industries in the Region, will significantly improve both air and water quality during the next five years. These locations will include Marathon, Red Rock, Terrace Bay, Dryden, Fort Frances, Kenora and Thunder Bay.

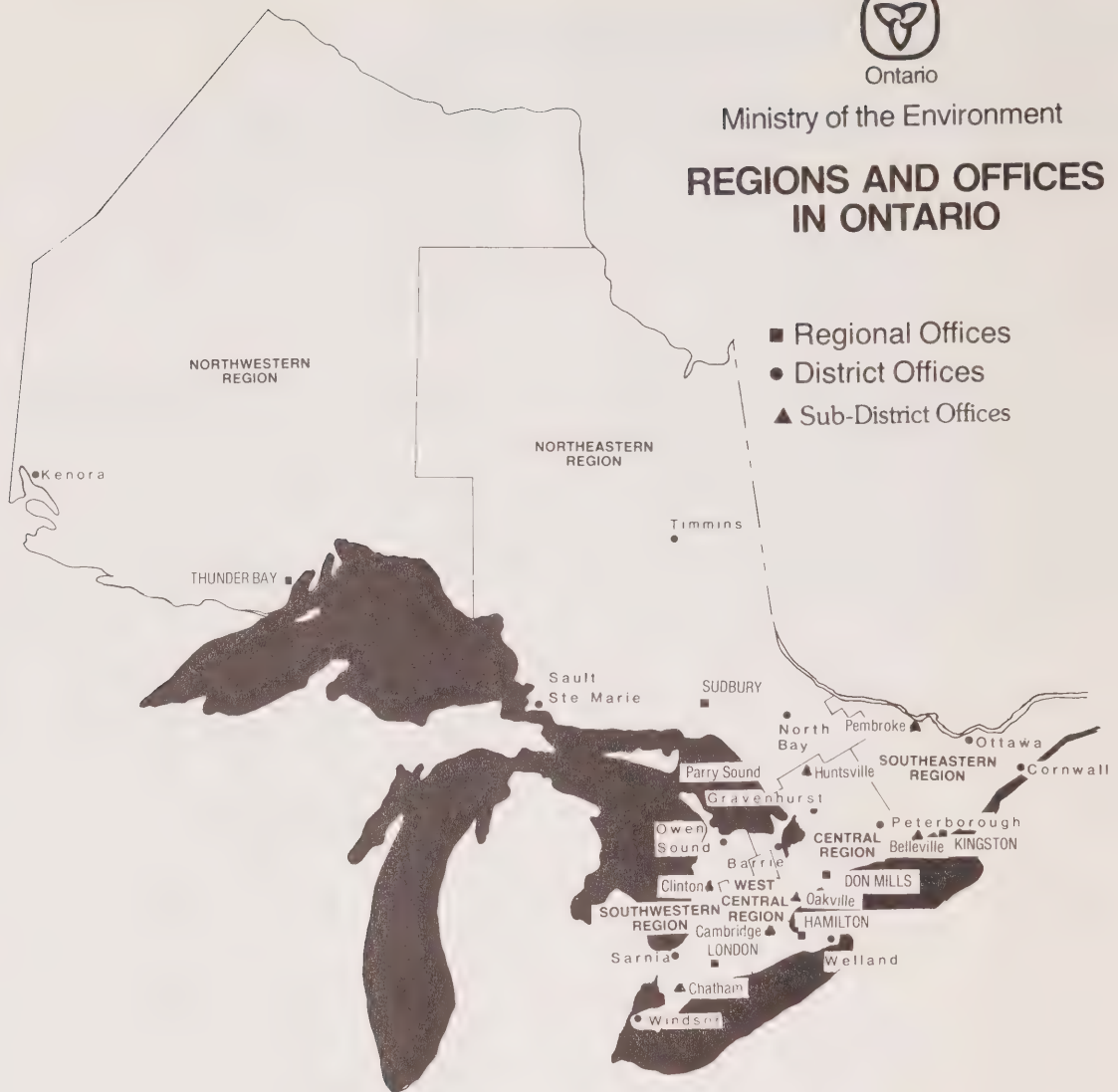
The program, now completed, on the grain elevators in the City of Thunder Bay has resulted in significant improvement in ambient air quality. Fifty to 70 per cent reduction in dustfall and suspended



Ontario

Ministry of the Environment

REGIONS AND OFFICES IN ONTARIO



- Regional Offices
- District Offices
- ▲ Sub-District Offices

Regional & District Offices

NORTHWESTERN REGION:

Thunder Bay Regional Office,
435 James St. S.
Thunder Bay P7C 5G6
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Kenora District Office,
808 Robertson St.,
Kenora P9N 1X9
Tel.: 807/468-5578

NORTHEASTERN REGION

Sudbury Regional Office,
199 Larch St.,
Sudbury P3E 5P9
705/675-4501

Timmins District Office,
83 Algonquin Blvd. W.,
Timmins P4N 2R4
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Sault Ste. Marie District Office,
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Sault Ste. Marie P6A 2J9
Tel.: 705/949-4640

North Bay District Office,
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Northgate Plaza,
North Bay P1B 2H3
Tel.: 705/476-1001

Parry Sound District Office,
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Tel.: 705/746-2139

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Cambridge District Office,
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Cambridge N1R 5W6
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Welland District Office,
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Welland L3C 1L9
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Kingston Regional Office,
133 Dalton St.,
Kingston K7L 4X6
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Tel.: 613/521-3450

Cornwall District Office,
4 Montreal Road, 2nd Floor,
Cornwall K6H 1B1
Tel.: 613/933-7402

Belleville District Office,
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Belleville K8N 1Z5
Tel.: 613/962-9208

Pembroke Sub-Office,
1000 MacKay St.,
Pembroke K8A 6X1
Tel.: 613/732-3643

particulate has been documented the past year through Ministry monitoring networks.

Municipal and Private Abatement

Seven major water and/or sewage projects were completed in the Northwestern Region in 1980-81 (see appendices).

Regional staff dealt with four communities under the Private Systems Grants Program. All of the projects dealt with the planning or provision of water systems.

One municipal waste site, Schreiber, and approximately 10 Ministry of Natural Resources (MNR) sites were closed. The municipal site was almost filled and operational problems were being experienced. The municipality combined with an adjacent municipality to develop one site to serve both. The MNR sites were closed, either due to being filled or because other sites were available.

Many waste management sites were improved as a result of the Provincial Waste Management Assistance Fund program. Eight municipalities had major improvements made to their waste management facilities.

A new waste management site was opened at Savant Lake. In addition, 10 new MNR sites were opened or relocated in unorganized areas.

A number of waste management studies were completed in the Region. These included major studies undertaken at Marathon, Manitouwadge and Thunder Bay, primarily to investigate leachate migration in the area and at Balmertown/Red Lake, and the Dryden sites for the establishment of new sites.

Although the Municipal and Private Abatement Unit does not regularly investigate wells, 12 investigations resulted from requests by the Health Units or individuals. In most cases, these investigations related to possible oil or other chemical contamination.

Thirteen marinas and approximately 40 boats, including three houseboats, were inspected. No violations were noted by staff.

Cottages were surveyed on three lakes in the Thunder Bay District under the Cottage Pollution Control Program.

A study was completed and a report prepared on the disposal practices for pathological wastes in the District of Kenora. Every hospital and veterinary clinic was visited as well as medical and dental clinics in the district. A report was submitted to a Head Office committee that was studying this subject to prepare a policy paper on the matter for the Province.

A significant improvement was noted in the drinking water quality at Nakina as a result of

government water and sewage programs in the Township.

In addition, a significant improvement is expected in the water quality of the Atikokan River as a result of the completion of the Atikokan sewage treatment plant where phosphorus removal is practiced.

Utility Operations

In 1980-81, the Region operated 13 water and 15 sewage projects serving 17,762 with water and 31,950 with sewage treatment.

Serious freezing problems had been experienced in the Town of Keewatin and the Township of Machin where the Province operates the complete water-works systems. As a result of new technology and the purchase of modern equipment the Ministry was able to reduce the freezing problems in the watermains and service connections by installing insulated pipe and heat tracing cables in sensitive areas.

Laboratory

The Thunder Bay Regional Laboratory provides chemical and analytical support for the environmental programs of the Northwestern Region. During the 1980-81 fiscal period, the laboratory performed 106,000 analyses. The chemistry unit performed 76,000 analyses on 10,200 samples while the microbiology unit performed 30,000 analyses on 13,500 samples.

New chemical analytical capabilities were developed for fluoridation candle and sulphation plate analyses prior to establishing this laboratory as the sole provincial source for these analytical services. The hot block digestion-automated buffering procedure for total nutrient analysis was implemented at this laboratory.

A qualitative isolation and biochemical identification procedure was developed for *Salmonella spp.* from surface water sources using either membrane filtration or swab recovery methods.

Environmental Planning

Fifty-five subdivision plans and 10 Environmental Assessment reports were reviewed.

Water Resources

Forty-seven water quality monitoring stations were maintained of which 11 supported the International Joint Commission Tributary Monitoring Program. Two observation wells were also operated.

Eleven new Permits to Take Water were issued during the year and seven permits renewed.

Under the Region's Lake Inventory Program, designed to update water quality information on lakes expected to experience development, 30 lakes in the Thunder Bay and Kenora areas were sampled.

Ten water quality assessments were undertaken in relation to industrial effluents, sewage treatment plant effluents, drinking water quality, dredging of contaminated sediments, and lake eutrophication.

Five groundwater quantity and groundwater quality assessments were undertaken.

Three hundred and thirty well water records were verified. The Region evaluated the sensitivity to acidic precipitation of 150 lakes in Northwestern Ontario. Included are lakes near Atikokan monitored for potential emissions from the thermal generating plant of Ontario Hydro.

Staff continued to investigate mercury pollution in the English/Wabigoon River system studying both the potential for remedial measures and the potential impact of abatement measures by Great Lakes Forest Products Limited, Dryden Division.

Sewage treatment plants at Atikokan and Nakina have improved water quality in the Atikokan River and in Balkam Creek.

A primary clarifier at Great Lakes Forest Products' mill at Dryden resulted in significant reductions in suspended solids concentrations in the Wabigoon River.

Air Quality

The Region operates approximately 90 instruments and recorders for air monitoring.

In 1980-81, staff undertook the following special surveys:

- PCB surveys for background data and to support cleanup operations following two PCB spills in Thunder Bay.
- Investigation of sulphur dust fallout at a local yacht club.
- Survey around an ash disposal site at Ontario Hydro's Thunder Bay generating station.
- Snow sampling near Pluswood Manufacturing Limited, a forest products manufacturing plant at Atikokan.
- Major phytotoxicology surveillance surveys continued in the vicinity of selected mining and pulp and paper industries.

In collaboration with the Air Resources Branch, long-term precipitation sampling commenced at four sites in the Region and plans were developed for additional monitoring locations. Research on the

effects of acidic precipitation on the terrestrial ecosystem of northwestern Ontario began during the year including base line soil and vegetation sampling, sensitivity mapping, and soil leaching experiments.

Five complaints of vegetation damage were investigated (two in Thunder Bay and three in Fort Frances). Only one of these was caused by air pollution.

Levels of particulate matter continued to decline in the City of Thunder Bay in response to a major, long-term dust control program completed at local grain elevators.

Dustfall and odour levels in Fort Frances showed improvement in 1980 as a result of upgraded emission controls at a kraft pulp mill.

Concentrations of offensive odours and particulate matter decreased substantially in Marathon following the commission of a new recovery furnace and a tall stack.

Northeastern Region

Director: C.E. McIntyre

Industrial Abatement

Four Control Orders were completed in 1980-81. Three were associated with air pollution abatement and one with both air and water.

The companies involved anticipate spending \$37 million on air abatement measures and \$22 million on water abatement.

During the year, Regional staff investigated 339 spills and 619 complaints.

Ministry staff held a public meeting early in 1980 to discuss extensions to the Control Order on E.B. Eddy Company Ltd. in Espanola. An amending Control Order was served on the company in May of that year.

Another public meeting was held in June of 1980 to discuss a proposed air management program for Inco Ltd. An amending control order and regulation was issued the following September.

Inco Metals Company was convicted on four charges in relation to a sulphur dioxide incident that occurred in 1978. The Company was fined \$19,500.

Staff worked with the Atomic Energy Control

Board on uranium mining, refining and licensing in the Elliot Lake and Blind River areas.

Abitibi-Price installed an air scrubber reducing odours at its Smooth Rock Falls operation. A new clarifier at the Spruce Falls Pulp and Paper Company is reducing the level of solids being discharged into the Kapuskasing River.

Air quality in Hearst is improving due to the shutdown of a tee-pee burner. The construction of a lagoon by CNR in Hornepayne has reduced the impact of accidental petroleum discharges on the Jackfish River.

Municipal and Private Abatement

New water and sewage facilities were completed in ten different locations (see appendices).

Staff processed over 1,700 applications for private sewage systems, refusing approval to 35. Staff also reviewed over 1,175 severance applications involving approximately 2,570 lots.

The Region was involved with 25 private sewage funding projects.

Fourteen waste disposal sites were closed during the year because they were either filled or causing environmental problems. Seventeen problem sites were substantially improved. Twelve new sites were established and certified.

Waste Management Studies were carried out in North Bay, New Liskeard, Burk's Falls/Armour/Ryerson, Sault Ste. Marie, Elliot Lake, Cochrane, Deloro Township (Timmins) and Kirkland Lake.

One hundred and forty-two complaints associated with water wells were investigated.

Seven pump-out marinas, 12 other marinas and 37 boats were inspected.

Two cottage surveys were completed. In addition, over 400 cottages were inspected under the Ministry's Cottage Pollution Control Program.

Air Quality

The Northeastern Region operates 150 monitors and 20 recorders. Staff also operate a central data collection system for the Sudbury airshed.

These special surveys were undertaken:

- a summer survey for sulphur dioxide, high volume sulphation and vegetation and soil monitoring near the Texas Gulf refinery in Timmins.
- a winter survey to investigate the effects of a seasonally operated smelter on air quality in Virginiatown.
- a total reduced sulphur monitoring program in Smooth Rock Falls to monitor the effects of

plant improvements at the Abitibi-Price Inc. mill.

The seedling and the white pine plot networks were expanded to continue monitoring effects of long range pollutants including acid precipitation.

Staff investigated 19 complaints of vegetation damaged by air pollution. Only one was proven valid.

The Sudbury air pollution index did not exceed 32.

Water Quality

The Region maintained 165 water quality monitoring and stream flow recording stations. Staff issued 36 permits to take water. They also sampled 93 lakes to assess sensitivity to development or to update water quality information.

Twelve water quality assessments were undertaken, 22 lake classification evaluations and 991 well records verified.

Cottagers on six lakes were involved in the Ministry's self-help program.

As part of the Ministry's acid precipitation studies, 30 lakes were each sampled 26 times for pH, alkalinity and conductivity. Ninety lakes were sampled once.

A small, seasonally acidic stream was sampled weekly both upstream and downstream from an experimental crushed limestone barrier.

Limnological sampling was completed monthly on two Sudbury area lakes in support of MNR fish studies related to acid precipitation.

Significant resources were devoted to the refinement of a water quality model for the Serpent River System.

The MOE surface water objective for radium 226 was met in the Serpent River at Hwy 17 downstream from an uranium camp.

Environmental Planning

Staff reviewed 68 municipal subdivision proposals and 22 environmental impact statements.

Utility Operations

The Utility Operations Section operated 21 Water Treatment Plants and 42 Water Pollution Control

Facilities during 1981 serving a total population of 236,000.

During the year the operation of five Water Pollution Control Facilities and two Water Treatment Plants serving a population of 160,000 was turned over to the Regional Municipality of Sudbury.

Staff assumed responsibility for the operation of Water Treatment Plants at Matheson, Val Gagne and Mattice and Water Pollution Control Facilities at Gore Bay, Mattawa and St. Charles.

The Utility Operations Section soil sampled more than 158 hectares (392 acres) of farmland in the Region during 1980-81 as part of its program to find suitable sites for utilization of sewage sludge.

Southeastern Region

Director: R.E. Moore

Industrial Abatement

During the year, one control order was issued. The company is expected to spend \$100,000 on water abatement measures.

Staff investigated 158 spills and 628 complaints. Routine inspections dealt primarily with odours and dust, pulp and paper, organic chemicals, textiles, mining and metallurgy, pits and quarries, dairy industry and wood industry. Air and pollution control programs completed at Canadian International Paper at Hawkesbury resulted in reduced biochemical oxygen demand (BOD) and suspended solids loadings to the Ottawa River from the company's sludge lagoons and improved control of SO₂ emissions.

Improvements in the pretreatment plant at BASF Cornwall have reduced the concentrations of BOD and suspended solids discharged to the municipal sewage system.

Groundwater in the vicinity of Masterloy Products, City of Gloucester, was tested to ensure that the public is not endangered by being exposed to contaminated drinking water and to monitor any changes in the quality of the groundwater. Chromasco Limited, Ross Township, installed a baghouse on one-half of the residue handling system at a cost of \$500,000 to reduce dust emissions.

E.B. Eddy Forest Products installed a sewage treatment plant for treating sanitary sewage from their

Ottawa mill. Odours of kerosene in the vicinity of Alcan Kingston were reduced by the installation of a scrubber.

Municipal and Private

Seven new major water and/or sewage plants were completed in the Southeastern Region in 1980-81 (see appendices).

The Section received and processed 420 applications for private sewage systems. All but 12 were issued Certificates of Approval. There were no appeals.

Staff also examined 307 applications for severances involving 637 parcels of land and forwarded their findings to the appropriate authorities.

Four waste disposal sites were closed in 1980-81, three because they had reached capacity and one because of complaints. Under the Ministry's Waste Management Improvement Program, 20 sites were improved.

Regional staff handled 91 private-sewage funding projects during the year. Over 200 complaints regarding wells were investigated. Under the Boating and Marina program, 183 pleasure craft and 66 commercial marinas were inspected throughout the Region.

Phase 1 of the \$1.4 million three-year Rideau River Stormwater Management Study, protecting the esthetic and recreational values of the river, was completed. The study is being conducted by M.O.E., Environment Canada, the Regional Municipality of Ottawa-Carleton, and the Cities of Ottawa, Nepean and Gloucester.

District staff met with staff of Rockland, Hawkesbury, Cornwall and Ottawa regarding additional studies of closed waste disposal sites. Cornwall has implemented a gas monitoring program while Ottawa has retained a consulting firm.

An area water supply study was conducted for the corridor between Pembroke and the Canadian Forces Base Petewawa. Various alternatives of supplying filtered water to the residents of the corridor were presented. Negotiations began with National Defence regarding their participation.

Technical Support Section

During 1980/81, the Planning & Approvals Unit reviewed 117 official plans and amendments, 594 zoning by-laws, 125 subdivision proposals and 23 miscellaneous planning documents. A total of 423 applications for approval under Ministry of the Environment legislation and 347 applications related to programs of other agencies were reviewed. The

number of environmental assessment reviews totalled 57.

Testimony was given at several Ontario Municipal Board hearings related to subdivision development.

Water Resources Assessment

The Region maintained 93 water quality monitoring stations and operated 12 observation wells; 55 Permits to Take Water were issued.

Through a co-operative program with the local Conservation Authorities, the Region undertook sampling programs on 45 lakes.

Sixteen water quality assessment studies were undertaken to determine the impact of point source waste discharges and the surface water implications of leachate releases from landfill sites.

Three lake classification evaluations were completed in association with shoreline subdivision development proposals. Cottagers on 99 lakes were enrolled in the Region's Self Help Program. Seventy-nine of these lakes were sampled frequently enough to be included in the 1980 report, entitled 'Enrichment Status of Lakes in the Southeastern Region of Ontario'.

The Region sampled 110 lakes in its program to inventory the sensitivity of lakes to acid rain inputs. By the end of the fiscal year, the Region had sufficient information to allow acid rain sensitivity classification of 375 lakes. Eighty-two lakes are considered to be sensitive and 293 lakes are believed to be insensitive.

During the 1980/81 fiscal year, the Region became involved in a major new activity. On an Interministerial Drainage Petition Review Committee, staff evaluated the water quality implications of 120 agricultural drains proposed for construction under the Drainage Act, 1975. Significant potential environmental concerns were identified with 12 of the proposed drains and general water quality concerns were raised with the design and construction of the remainder of the drains. As a result, more attention was given to drainage design and construction details and some drains were redesigned to mitigate the more serious Ministry concerns.

Municipal sewage treatment plant abatement measures have reduced point source phosphorus loadings to the Bay of Quinte from a former high of 214 Kg/day to 72 Kg/day in 1980. A decline in phosphorus and chlorophyll levels has been documented throughout the Bay of Quinte, along with a general public perception of improved water clarity and evidence of improved municipal drinking water quality. The Bay of Quinte walleye fishery has also experienced a dramatic resurgence.

Air Quality

The Region operates 20 continuous air monitors with recorders, and 40 passive and intermittent monitors.

A continuous SO₂ monitor was installed in Hawkesbury to provide information on emissions from CIP. Several short term special studies were conducted at Bancroft (radioactivity), Deloro and Kingston (arsenic and heavy metals) to obtain information on localized problems.

Several complaints of vegetation damage were investigated, but only one incident of air pollution damage was substantiated. The Region continued to maintain its monitoring station for total reduced sulphur (TRS) at Domtar, Cornwall. The station allows for more effective abatement strategies to be employed by plant operators. The SO₂ in Hawkesbury and TRS in Cornwall are now under better control and should show a reduction over the next few years.

Laboratory Operations

Automated facilities to measure low level alkalinities in support of the acid precipitation program supported both MOE and MNR lake assessment programs.

The Kingston laboratory routinely provides water and waste analysis for all federal establishments in the Region as well as analytical support for the Ministry of Natural Resources' fisheries and hatcheries activities. Fluoride and nitrate analysis is provided for all Health Units in the Region.

Several analyses reports were prepared on request for Health Units wishing to take legal action in cases of improper sewage disposal.

In addition, several requests for analysis and consultation from federal and municipal governments and industry were answered.

The Kingston laboratory performed 109,689 chemistry tests on 14,904 samples. It also performed 51,783 microbiology tests on 23,844 samples.

Utility Operations

The Region operated 40 sewage projects serving a total population of 206,224 and 23 water projects serving a total population of 77,540.

In 1980 the water project of the Village of Wellington in the County of Prince Edward with a population of 1,067 was turned over to local authorities.

The Region also developed an overall plan for the containment of arsenic residue left by the abandonment of the gold mining and refining plant operations.

West Central Region

Director: G.H. Mills

Industrial Abatement

Four Control Orders were issued, one of which was completed in 1980-81. Two were associated with air pollution abatement, the rest with air and water pollution abatement. The companies involved anticipate spending over \$73.7 million for air pollution abatement and over \$40.9 million for water pollution abatement over the duration of the orders.

One directive was issued as well as 17 requirements. Thirteen of the requirements were related to discontinuing the use of apartment building incinerators which could not meet Ministry air quality standards.

Staff investigated 141 spills and over 1,250 complaints. Many involved odours from industries or farms.

Inco Metals installed a wastewater treatment plant to remove nickel from its industrial discharge.

Norton Company shut down its Crystoloden facility, thereby reducing hydrogen sulphide and sulphur dioxide emissions.

Fraser Inc. (formerly Abitibi Provincial Paper) installed a wastewater treatment facility to reduce the quantity of organic material discharged from its de-inking operation.

Sod was removed and replaced at Manchester Public School in Cambridge to eliminate potential metal contamination problems resulting from emissions by Cambridge Brass.

An environmental survey of Date Industries Ltd. in Ayr resulted in the installation of a new baghouse collector on the sand handling system, which should alleviate high dustfall levels.

Rockwell Manufacturing Ltd. in Guelph completed the installation of electric induction furnaces to replace existing cupolas. These furnaces have solved the problem of particulate emissions.

Rothsay Concentrates Co. Ltd., in Rothsay, developed an odour abatement program involving revamping of existing odour control equipment and installation of three-stage chemical scrubbing on high intensity odours.

Municipal and Private Abatement

Ten major water and/or sewage projects were completed in the West Central Region in 1980-81 (see appendices).

Nine solid waste management sites were closed, mainly because they had reached capacity. A tenth site was closed because its location and topography were not suitable. One new site was opened.

A number of waste management studies were completed. These included reports on alternative sewage handling systems for the Regional Municipality of Haldimand-Norfolk the location of old solid waste disposal sites and the identification of potential problems, and a feasibility study on an Energy from Wastes project in the Niagara Region.

Regional staff investigated 165 complaints. There were 73 inquiries related to private well problems.

Under the Ministry's boating and marina program, staff inspected 330 boats and 35 marinas. Owners of 10 boats and the operation of one marina were found in violation.

The City of Niagara Falls and the Regional Municipality of Niagara agreed to undertake a major storm water separation program in Niagara Falls to eliminate the Stanley Avenue outfall which has had an adverse impact on the Welland River water quality.

A new sewage treatment plant with tertiary treatment facilities in the Village of Shelburne discharges an improved effluent into the Boyne River (the river is regarded as an excellent trout fishery). The plant is unique in that it can use existing sewage lagoons for holding final effluent for up to two months. Sewage can, therefore, be held back during the spring and fall fish spawning seasons.

Environmental Planning

Staff reviewed 86 municipal subdivision proposals, over 80 proposed official plan amendments, a comprehensive zoning bylaw and approximately 20 Environmental Impact Statements or reports.

Water Resources

Eighty-four water quality monitoring stations, seven automatic streamflow recording stations, six manual streamflow recording stations and 25 observation wells were maintained.

One hundred and thirty-nine surface Water-taking Permits and 25 groundwater permits were issued. Nineteen of each of these were new permits.

The sensitivity of Pike Lake to development was evaluated.

Stream water quality assessments were completed for nine municipalities on the Upper Grand Watershed and the assessment of the impact of the sewage treatment plant at Orangeville on the Credit River was continued.

Twenty-five groundwater quantity and quality investigations were carried out. About 1,700 well

records were verified. Preliminary investigations started on the potential use of the South Cayuga site for industrial waste treatment.

A review was carried out on the waste site identification study which identified 24 industrial and 54 municipal disposal sites. Follow-up field studies were conducted on 14 of these sites.

About 1,000 requests for groundwater data, 300 for surface water data and 500 for fish contaminants data were answered. Twelve fish kills were investigated. Twelve marine construction evaluations were carried out.

Leachate from the Upper Ottawa Street Landfill Site was redirected from Redhill Creek to the sewage treatment plant.

Air Quality

The Region's air quality monitoring network operated 192 devices.

The following special air quality surveys or monitoring programs were undertaken:

- Smithville—Concern for high PCB readings near a transfer station.
- Diamond Shamrock, Hamilton—Investigation of odour complaints due to various organic compounds.
- Uniroyal, Elmira—Identification of organic compounds associated with the manufacturing process.
- Upper Ottawa Street Landfill Site—Monitoring air quality in the vicinity of the landfill site.

There were 12 complaints alleging vegetation damage due to industrial emissions. All were investigated and reported on by the Phytotoxicology Section of the Air Resources Branch and were found to be due to natural causes.

The API exceeded the advisory level of 32 six times for a total of 84 hours in Hamilton. The alert level of 50 was not reached. No values in excess of 32 were recorded at St. Catharines and Niagara Falls.

Pesticides

Approximately 175 pesticide related complaints were investigated. Approximately 500 routine inspections on the premises of licenced retail and wholesale pesticide vendors were carried out.

Over 70 permits, to use or purchase pesticides, were issued under the Pesticides Act.

Utility Operations

The Region was responsible for the operation of 37 water pollution control plants, serving a population of approximately 410,000.

The Elora Water Pollution Control Plant was turned over to the municipality.

Central Region

*Director: D.P. Caplice

Industrial Abatement Section

Three Control Orders dealing with air emissions were served and one Director's Order under Section 41 of The Environmental Protection Act dealing with air emissions was served as well.

During the year, the capital expenditure by industry to abate existing problems was \$56,179,896 for programs associated with air pollution abatement and \$2,872,700 for water.

Staff investigated 204 spills and 3,386 complaints. Routine inspections dealt primarily with air and water emissions.

Additional control and maintenance activities at the Shell and BP refineries in Oakville resulted in an improvement in air quality and a significant reduction in the number of complaints.

Canada Metal Company Limited in Toronto completed its Control Order in early 1981 at a cost of approximately \$1.25 million.

Eldorado Nuclear Limited in Port Hope installed a water condenser in its uranium nitrate boildown stack to reduce emissions.

Union Carbide, in Lindsay, completed the construction and started operation of an evaporation and crystallization system for recovery and treatment of concentrated waste sodium sulphate and ammonium sulphate solutions. This eliminated the need for the disposal of these solutions in landfill sites.

Municipal and Private Abatement

Seven major water and/or sewage projects were completed in 1980-81 (see appendices).

The Municipal and Private Abatement Section received 1,233 applications for private sewage systems. Staff issued 1,196 certificates. They also reviewed 548 applications for severances involving 1,189 parcels of land.

Staff dealt with seven projects under the Ministry's Private Sewage Funding program.

Three waste management sites reached capacity and were closed. One incinerator was closed for environmental reasons, 14 waste sites were improved and one new site was opened in Ops Township to serve the Town of Lindsay and the Township.

The Muskoka District area-wide and the Metropolitan Toronto Area Waste Management Studies were completed in 1980. Both studies were in part funded by the Ministry.

Twenty-six well complaints were investigated. During the summer of 1980, 1,041 boats were inspected, 31 violations were recorded, and 143 marinas were inspected. During the year, 1,586 cottages were inspected in Haliburton, Muskoka and in Victoria under the Cottage Pollution Control Program.

The abandoned site preliminary studies were completed on 54 priority sites in the Region. The main concern of the program is that methane gas could gain access to buildings and structures. The reports from the reviews were forwarded to the municipalities with the request that where a hazard was evident, that remedial works be installed and that building on hazard lands be controlled. At one site in Brampton, gas was detected in homes and detection devices were installed by the municipality.

Air Quality

During 1980-81, approximately 600 instruments monitored air quality in 25 communities throughout the Region.

In general, the highest levels of pollutants in the region are found in downtown Toronto. In Toronto, the significant improvements in air quality achieved during the 1970s have been maintained. The greatest success has been the decrease in sulphur dioxide levels. In the past year, none of the criteria for sulphur dioxide has been exceeded. Lead levels throughout the region have decreased because of the increasing use of unleaded gasoline.

The Toronto air pollution index remained below the advisory level of 32 during 1980. This is the first year since the start of the index in 1970 that this objective has been achieved. The highest level reached was 31 on December 8, 1980.

Other highlights:

The air monitoring program was expanded by the establishment of a major monitoring station in the Junction Triangle area of Toronto. In addition, the station in Oakville was relocated to be closer to the Shell-BP refinery complex.

The intensive lead monitoring program around secondary lead smelters and major lead users was

D.P. Caplice is attending the Department of National Defence Senior Officers Training Program from September, 1981 to August, 1982. The Acting Director for the Central Region during this period is G. Mierzynski.

continued. The most dramatic decrease in lead levels was found in the vicinity of the Canada Metal plant on Eastern Avenue in Toronto as a result of the implementation of a control order issued by the Ministry.

Asbestos monitoring was continued on an intermittent basis around the major asbestos users in the region. The largest user, the Canadian Johns-Manville plant in Scarborough, closed its asbestos operations and monitoring was discontinued. In general, the asbestos levels were below the guideline concentration deemed acceptable.

Radioactivity levels were monitored in the vicinity of the Pickering Nuclear Generating Station, and the Eldorado Nuclear plant in Port Hope. Levels were generally similar to those monitored in downtown Toronto.

In a joint survey with the Toronto Transit Commission and the Ministry of Labour, pollutant levels consisting of suspended particulate, lead, iron, carbon and asbestos, in the Toronto subway system were monitored. As a result of changes in the composition of brake shoes used on the subway cars, pollutant levels were significantly decreased. The most outstanding decrease was found in lead levels which fell below the desirable ambient air quality criterion. The survey concluded that there was no discernible health hazard to TTC employees or to passengers.

Water Resources

Stream water quality monitoring stations were maintained at 208 locations. Eleven recording and 11 periodic stream flow stations, as well as 29 recording observation wells, were maintained.

Water quality studies were carried out on 11 lakes to determine their present trophic status and to assess their sensitivity to future development.

Water quality monitoring programs on Lake Simcoe were expanded. The yearly ice-free water quality monitoring program was increased from three to nine lake stations, plus one on the lower Holland River. Additionally, a weekly winter monitoring program, using one sampling location was put into operation.

Water quality assessments were carried out on five water courses to evaluate the impacts of both existing and proposed municipal and industrial discharges.

An aquatic macrophyte assessment of Sturgeon Bay, in the Georgian Bay area was conducted in relation to a proposed Victoria Harbour sewage treatment plant discharge.

There were 33 groundwater quantity and 72 groundwater quality investigations. The environmental impact of 54 active and proposed municipal and industrial landfills was assessed. There were 1,334 water well records verified and 3,235 records were received for verification.

Seventy-five lakes were involved in the cottagers' self-help program.

Information on the existing pH and alkalinity levels were obtained from 50 lakes in the District of Muskoka and Counties of Haliburton and Peterborough. This was part of the province-wide baseline data collection effort.

The Groundwater Group was involved in the environmental impact assessment of abandoned landfill sites in the Region; 58 municipal and 17 industrial sites were studied.

Based on limited water monitoring results, the water quality of the lower reach of Duffin Creek has shown improvement. This is likely due to the redirection in 1980 of the Duffin Sewage Treatment Plant's flows from the creek to the York-Durham sewage system.

Planning and Approvals

Environmental Planning Staff reviewed 430 subdivision plans (increase of 12.5 per cent over the previous year) and 382 official plans and official plan amendments (increase of .5 per cent over previous year). They were also involved in 87 approvals for the Niagara Escarpment Commission, Parkway Belt, Pit and Quarry Applications and 35 Environmental Assessment Reviews, Pre-Submissions and consultations (46 per cent increase).

The Environmental Approvals sub-section issued the following Water Taking and Industrial Approvals in 1980-81:

WATER TAKING APPROVALS			
	Ground-water	Surface Water	Total
New Permits	23	22	45
Letters of Approval	22	7	29
Renewals	10	54	64
			138
INDUSTRIAL APPROVALS			
Certificates of Approval for emissions to the atmosphere—			353
Certificate of Approval for emissions to water—			14
		Total	367
Increases of 10 per cent over 79-80.			

Utility Operations

The Region operates 18 sewage plants and 14 water plants serving a population of 520,000. Discussions continued with Region of Peel with regard to the turnover of the South Peel system, serving a population of 400,000 in the Regional Municipality. Projects in Durham, York and Halton Regions are now operated by the Regions. This includes the new York-Durham Duffin Creek system.

Southwestern Region

Director: D.A. McTavish

Industrial Abatement

Regional staff initiated and completed three control orders: two air pollution abatement and one water abatement. Local industry spent \$8 million for air and \$6.5 million for water pollution control installations.

As a result of continuing problems of gross discharges of liquid manure into streams causing major kills of fish, the Southwestern Region continued efforts to inform farmers of the seriousness of this problem and the measures necessary to bring the situation under control. Charges were laid by the Ministry resulting in convictions of three farmers. This year, only 244 applications for Agricultural Certificates of Compliance were received which represents a reduction of about 65 per cent compared to the numbers dealt with in each of the previous two years.

Significant progress has been made in reducing fluoride emissions from the Allied Chemical hydro-fluoric acid plant in Amherstburg. The success of abatement efforts is reflected in a reduction of average fluoridation rate in the vicinity of this plant from 165 to 25 micrograms/100 cm²/month. The Ontario ambient air quality criteria for this contaminant is 40 and 80 micrograms/100 cm²/month depending on the season.

Municipal and Private Abatement

Fourteen major water and/or sewage projects were completed in the Southwestern Region in 1980-81 (see appendices).

Regional staff received 249 applications for private sewage systems; 245 of these were granted Certificates of Approval. In addition, 199 severance applications involving 314 parcels of land were inspected and written reports were made to the appropriate authorities.

Four private-sewage grant projects were handled by the Region.

While one site in the County of Oxford was closed, 21 waste management sites were improved using the funds in the Waste Management Improvement Contract.

Approximately 300 well complaints were investigated by Regional staff.

One hundred and five boats were examined; four were found to be in violation. Four marinas were also inspected.

Air Quality

There were 130 monitoring instruments, including 51 Hi-Vol particulate samplers, operating in the

Southwestern Region in 1980-81. In addition, dustfall samples were collected at 42 sites and fluoridation rates were determined for 39 sites. A total of 45 recorders were operated.

Special air quality surveys or monitoring programs undertaken in 1980-81 were:

- measurements of total suspended particulates, heavy metals in total suspended particulates, nitrates, sulphates and organic compounds, in the vicinity of the Ridge Landfill site in Harwich Township;
- measurements of lead levels in total suspended particulates in the vicinity of Exide Canada Inc., Woodstock; and
- measurements of total suspended particulates and dustfall in the vicinity of Western Foundry, Wingham.

Air quality data and reports were exchanged with agencies in Michigan in accordance with the Memorandum of Understanding on Transboundary Air Pollution Control in Southwestern Ontario—Southeastern Michigan Area.

Monitoring for radioactive constituents in total suspended particulates continued as part of the Bruce Nuclear Power Development Contingency Plan. The Ontario Ministry of the Environment section of the Survey Co-ordinating Group Procedural Manual was prepared for the BNPD site contingency plan.

The Air Pollution Index exceeded 32 on only one occasion when it reached a maximum of 34 in Sarnia on February 16, 1981.

Levels of total suspended particulates were drastically reduced in the vicinity of the Windsor casting plant of Ford Motor Company of Canada, Limited as a result of additional pollution control equipment, reduced production and ultimate plant shutdown in September 1980.

Water Quality

The Region monitors the quality and quantity of both surface and ground waters with its monitoring network. With the co-operation of local Conservation Authorities, the water quality of rivers and streams is measured monthly at approximately 130 locations. Measurements of streamflow are also made, either through the use of continuous-recording instrumentation, or through the use of spot measurements, at about 30 stream locations.

Groundwater monitoring in the Region was achieved through

- (1) the use of 31 observation wells;
- (2) through the water well program in which 2338 new wells were inspected; and,
- (3) through the investigation of 254 inspections relating to existing or potential problems.

Numerous specific groundwater and surface water studies were also carried out. Groundwater studies resulted in 93 reports regarding the present or possible impact of landfill sites, subdivision proposals, well tests, etc. Detailed groundwater surveys were

carried out in Sydenham Township to evaluate agricultural impact, in Harwich Township to evaluate groundwater sensitivity to a proposed industrial-waste landfill, and at Markdale to determine the feasibility of a sewage infiltration system.

Specific water surveys were carried out to determine the impact of five municipal sewage plants and four sewage lagoons on surface waters. The future impact of numerous sewage plant and lagoon expansions was also predicted, and waste-loading guidelines were established. The Region also worked with the Water Resources Branch in connection with the Listowel Artificial Marsh Project, and the Stratford-Avon River Environmental Management Project.

A total of 31 lakes and bays were sampled to assess sensitivity to development or to update water quality information.

Thirty fish kills were investigated, with the majority of these being caused by agricultural spills and discharges. Staff assisted the Ministry of Natural Resources in opposing the Folden's Creek drain near Ingersoll, and a report was prepared on Judges Creek (Bruce County) defining adverse impact from a drain clean-out. In addition to the Judges Creek report, major reports on surfacewater resources included the report on the Bayfield River, and the report on Winter Lagoon Data.

Staff issued 158 Permits To Take Water.

Environmental Planning

The Environmental Planning Section reviewed 100 municipal subdivision proposals and 11 formal submissions under the Environmental Assessment Act.

The Approvals and Planning Unit co-ordinated and provided regional input to the review of 184 plans, amendments, zoning orders, Niagara Escarpment permits and Ontario Municipal Board referrals. It also co-ordinated and provided technical support input to the Region's response on over 210 engineering reports, Certificates of Approval ensuring compliance with air quality requirements, permits for water taking, as well as submissions by the Ministry of Natural Resources under the Pits and Quarries Control Act and the Lakes and Rivers Improvement Act.

Laboratory Operations

The London Regional Laboratory performed 180,574 chemistry tests on 19,781 samples and 49,753 microbiological tests on 16,741 samples in 1980-81.

Developmental work on the media for *Clostridium perfringens* and *Yersinia enterocolitica* was completed. Both of these analytical capabilities are now available in the Southwestern Region.

Utility Operations

Staff were involved with the operation of 64 sewage treatment facilities, 26 water supply facilities and 39 other miscellaneous projects, such as water distribution systems and pumping stations, serving a total population of approximately 730,000.

One tertiary sewage treatment plant and three sewage lagoon facilities with collection systems were completed in 1980-81. As well, a water supply and distribution system was completed at Plattsville and water was supplied from pipelines to Dashwood and Shrewbury-Raglan. Seven sewage projects and three water projects were under construction at year end.

Laboratory Services Branch

Director: G.C. Ronan

The Laboratory Services Branch provides Ministry branches with chemical and microbiological analytical support for their environmental assessment and pollution control programs. The Branch participates in planning programs requiring analytical expertise and assists in data interpretation. Updating analytical methods and developing procedures for measuring new environmental pollutants are other key Branch activities.

Staff participate in environmental research projects aimed at clarifying the interaction of atmospheric, terrestrial, and aquatic pollutants with the environment and their effect on human health. The Central Laboratory provides technical and quality control advice to the regional laboratories in Thunder Bay, London and Kingston.

In response to the workload demands, the Central Laboratory increased its test output by 10 per cent over last year. 1,240,000 tests were completed compared to 1,130,000 in 1980.

Analytical Test Production

The laboratory provides input to sampling survey planning, expertise in data assessment, and a wealth of analytical data. Table 1 shows this year's test load summary compared to last year's.

TABLE 1: LABORATORY TESTLOAD SUMMARY

1980 - 1981

Laboratory Sections and Regional Labs.	Chemistry (in thousands)		Microbiology (in thousands)		Total	
	79/80	80/81	79/80	80/81	79/80	80/81
London	166.4	180.6	43.4	49.8	209.8	230.4
Thunder Bay	70.4	75.7	35.8	30.0	106.2	105.7
Kingston	85.0	109.8	45.0	51.8	130.0	161.6
Regional Sub-Total	321.8	366.1	124.2	131.6	446.0	497.7
Inorganic Trace Contaminants	283.4	357.1			283.4	357.1
Water Quality	649.8	655.5			649.8	655.5
Pesticides (Scans)	7.7	8.7			7.7	8.7
Organic Trace Contaminants	51.8	91.8			51.8	91.8
Microbiology			135.8	128.9	135.8	128.9
Central Lab Sub-Total	992.7	1113.1	135.8	128.9	1128.5	1242.0
TOTAL	1324.5	1479.2	260.0	260.5	1574.5	1739.7

Clients and Programs

The laboratory's clients consist mainly of the Regions and the Environmental Assessment and Planning Division. Discussions on sampling timing, survey size, and priorities helped serve as a regulator on analytical production in many of the diverse sampling programs and emerging programs like Acidic Precipitation in Ontario Study and priority pollutants scanning for air-borne and water-borne organics access were given increased analytical support.

Close to 70 per cent of the overall test production in the Ministry was in support of regional activities.

Table 2 shows the laboratory workload according to major programs and surveys, distributed between regional and head office clients.

The 1980-81 fiscal year saw a continuation of the high laboratory usage for major programs, as well as the emergence of the Acidic Precipitation in Ontario Study (APIOS) as a major user of laboratory capacity. Over 150,000 tests were performed in support of this growing program, for anions, nutrients, metals and microbiological parameters on a wide range of sample types (precipitation, fish, algae, soil).

Organic analyses continued to have a high profile and increased demand. Besides large-scale monitoring programs such as trihalomethanes in water and PAH's in air, extensive organic analysis was required in problem solving and contingency situations for regional and head office groups. The water monitoring program for Niagara-on-the-Lake and St. Catharines was the largest single user of the Mass Spectrometer-GC system, while analysis of organics associated with landfill sites and industrial wastes monitoring were other major users of the increasingly sophisticated organic analysis capability of the laboratory. Concern about toxic material issuing from the Niagara Falls, New York area also resulted in a high demand for tests of drinking water for dioxin, PCB and Mirex.

In the Pesticides Section, modifications to the dioxin laboratory were completed, but the above-noted increases in requirements for dioxin analysis quickly resulted in a back-log.

The Water Quality Section saw major workload increases due to marshland studies, Great Lakes sampling, and recreational lake studies.

The Water Quality and the Inorganic Trace Contaminants Sections both had major workload increases due to APIOS, Stratford-Avon Study, landfill monitoring and the sludge application projects.

The Characterization of Hauled Liquid Industrial

Wastes (CHLIW) project had a major impact on the Organic and Inorganic Trace Contaminants Sections as well as the Water Quality Section, as several thousand tests had to be performed on a very complex series of industrial samples.

Fish continued to be used as an indicator of organic and inorganic water pollution. While demands for the analysis of mercury and PCB in fish declined, metals such as aluminum, lead and zinc were in increasing demand. Requests for lead analysis in air, water, and vegetation saw a remarkable increase this year, as nearly 40,000 lead tests were completed.

Metals other than lead that had a high demand rate (over 15,000 tests each) were: zinc, copper, nickel, iron, chromium, aluminum, mercury, and arsenic.

In the Microbiology Section, most work was carried out in connection with surveillance of municipal drinking water quality. Major surveys were conducted in the Niagara River, Lake Ontario, St. Mary's River (Sault Ste. Marie) and around Toronto Harbour and Hamilton Harbour. The Lakeshore Capacity Project terminated this year.

The Biohazards Unit underwent renovations this year, but still completed a survey of industrial effluents discharging to the St. Clair River, which were analyzed for the presence of mutagenic and DNA-damaging activity. Virology studies were carried out on several sewage treatment plants and bathing sites on rivers and lakes.

Analysis of samples taken as a result of public complaints were numerous this year, and required innovative applications of microbiological, organic and inorganic investigative techniques.

Many of these cases resulted in extensive analytical reports which were used as court evidence, the basis for insurance claims, supporting information for Ministerial orders.

Highlights of these studies:

- (1) The use of X-ray diffraction and polarizing light microscopy to identify as mineral wool (and not, as suspected, asbestos), an insulation material which had become air-borne during the stripping of steel columns in the vicinity of a public transportation depot in Toronto.
- (2) The identification of an orange colored deposit on the surface of vehicles in the vicinity of an industrial metal treating plant in

Toronto through the use of the electron microprobe device. (The analysis showed the deposit to be iron chloride resulting from plant emissions).

- (3) Using light and electron microscopy to determine the source of 'paint overspray' which caused esthetic damage to automobiles in Central Region.
- (4) Using X-ray diffraction and light microscope techniques to identify fallout causing damage to painted surfaces in the vicinity of a West-Central Region quarry as emissions from the operations associated with the quarry.
- (5) The identification and comparison of fallout as a result of the sand-blasting operation at the Burlington Skyway using optical and electron microscopy as well as atomic absorption spectrophotometry.
- (6) The identification of a 'soot-like' fungus which proliferates on painted surfaces and vegetaton in samples submitted from all regions except North-West. This problem has occurred in past years but 1980-81 showed a tremendous increase in the number of complaints from people believing it to be the result of industrial emissions.

Several special ventures were undertaken by the laboratory this year, including construction by the Water Quality Section of a completely self-contained mobile laboratory to support various field programs; a residual chlorine field study of Toronto Sewage Treatment Plant effluent into Lake Ontario, performed on board the vessel Guardian No. 1; and a chlorine study of the Thames River. Staff also performed complex field arsenic speciation studies on drinking water sources in the Sudbury area, and metal speciation in the field at various Ontario Lakes. Laboratory staff trained regional MOE personnel in the setting up and operation of a field arsenic analysis system to monitor the arsenic waste treatment system installed at Deloro, South-East Region.

Administrative Services

The initial implementation of the Laboratory Information System, a computerized data storage and processing system, began in the fall of 1980. At the end

TABLE 2: TEST PRODUCTION 1976—1981

Year	Regional Laboratories	Toronto Laboratory	Laboratory Services Branch
1976/77	378,000	1,272,000	1,650,000
1977/78	420,000	1,360,000	1,780,000
1978/79	440,000	1,262,000	1,702,000
1979/80	446,000	1,144,000	1,590,000
1980/81	498,000	1,242,000	1,740,000

of the fiscal year, approximately forty per cent of the samples submitted to the central laboratory were being handled by the LIS. During this implementation phase a number of system faults have been corrected and several changes have been made which will improve the system's delivery of detailed analytical and sampling data to laboratory clients.

Central Stores

The Central Stores Unit issued \$900,000.00 worth of chemicals, glassware, sample kits and small equipment items in support of Ministry sampling and analytical activities. Thirty-two thousand sampling kits were issued to field sampling staff and 700,000 bottles and tubes were processed for sampling and analytical use. Local purchasing was established to provide a more effective and flexible system for obtaining goods and services under \$500.

Other Activities

The laboratory newsletter "Analysis" continued to provide readers with information on items of environmental interest and on developments in the field of environmental analysis. Circulation is up to 800 copies per issue. The newsletter was joined by a second laboratory newsletter dealing exclusively with dioxin news. Circulation is restricted to 150 scientists worldwide.

Quality control continued to be an integral part of all Branch operations. Approximately 100,000 analytical tests were performed in addition to those reported to clients, in support of the numerous quality control programs in the sections. Round robin samples and other interlaboratory materials were exchanged with dozens of similar institutions in the U.S., Europe, and other provinces, covering virtually every type of sample (fish, water, sediment, soil, air particulates) for most parameters, in an on-going effort to validate and control the analytical data being reported to clients. In general about five per cent of the analytical output is devoted to the continuous effort of systematizing and maintaining quality control.

finance and administration division

Executive Director: G.E. Higham

Financial and Administrative Services Branch

Director: W.D. Wood

Accounts Payable

In 1980-81, the Accounts Payable Section processed 148,600 invoices amounting to \$129,232,803 and disbursements and charges amounting to \$124,240,664.

Financial Reporting and Control Services

The Financial Reporting and Control Services Section is responsible for maintaining an effective management information system and providing budgetary controls for all Ministry expenditures. This section is also responsible for: improving financial control and contributing to greater efficiency of the entire financial management program of the Ministry by maintaining and developing a comprehensive financial analysis system; providing reconciliation services for Management Information System and Integrated Personnel Payroll Employee Benefits reports; providing cashier, cheque distribution and mail services; and preparing the Ministry's annual public accounts submission.

Systems Operations

New responsibilities for the Systems Operation Section included the implementation of the following:

- (1) a forms management system for the Records Management Section; and,
- (2) a skills resources inventory system on behalf of the Personnel Services Branch.

Updating of the above new systems is the responsibility of the Systems Operations staff.

Purchasing

During the year, the Purchasing Section processed 9,004 purchase orders for a total value of \$36,831,000.00.

COBIS Development and Support

COBIS is a multi-ministry financial system designed to store, process and report expenditure data for individual user Ministries as well as provide requisitions for payment and computer files of central account and payment data to the Ministry of Treasury and Economics. At the beginning of the year, the group which supports this system with systems analysis and computer programming services was transferred to this Ministry. During the year, the major development thrust was to provide more options in the number and content of budget and expenditure management reports.

In most cases, the water and sewage plants were also operated by the Ministry. The statutory and contractual activities in this area include: conducting service rate reviews (120 in 1980-81); maintenance of accounting records, the reporting of financial aspects of various water and sewage projects as required by agreements and legislation; assisting municipalities in implementing billing and collecting procedures under various service and term agreements and assisting in bylaw reviews when requested. The gross revenue generated by these activities in 1980-81 amounted to \$82.5 million.

Cost Sharing Agreements and Grants

Administration of claims under the Canada/Ontario cost sharing agreements resulted in reimbursement of expenditures of \$1.2 million.

Loans from the Canada Mortgage and Housing Corporation amounted to \$29.8 million.

Provincial Assistance on projects under Service Agreements amounted to \$45 million. Direct grants to municipalities amounted to \$48.7 million. In addition, claims processed under the Community Services Contribution Program amounted to \$23.2 million.

Capital Financing Office

Manager: C.D. Mialkowski

Water and Sewage Works

Financial management was provided for 765 projects under agreements with municipalities and industry. The following table is an analysis of the financing of 500 Term Loan Agreements and for 265 Provincially owned works under Service Agreements.

**Investment in Water and Sewage Works
as of March 31, 1981
(at cost less recoveries)**

	1981	1980
	(\$ millions)	
Term Loan Agreements		
Water Works	38.7	36.1
Sewage Works	55.9	58.2
Service Agreements		
Water Works	306.8	298.5
Sewage Works	715.0	668.9
Total Investment	\$1,116.4	\$1,061.7

Systems Development

Manager: G. Scanlon

In 1980-81 the Systems Development Section in conjunction with User Branches worked on a wide variety of projects. The following are brief descriptions of some of those projects.

- **Utility Rate Information System (URIS):**
The system was expanded to include a new selective retrieval system and optimized to improve operating efficiencies.
- **Hazardous Contaminants Inventory System:**
The system was modified to permit the storage of new data fields on the master file. Several new report modules were added to the system. Contaminant inventory data for selected companies is being stored.
- **Industrial Monitoring Information System (IMIS):**
A committee was established and a number of meetings held with the Regional Branches to define the requirements for an

automated system. A Quality Review Board was then set up to oversee the development of the system, to take place in the next fiscal year.

- **Total Utility Monitoring and Management Information System (TUMMIS):**
The development of the TUMMIS system—Phase I commenced late in the fiscal year with implementation planned for August 1981.
- **Laboratory Information System:**
The system was operational in early 1981. Management Information Report Modules were developed and implemented during the fiscal year as well as minor modifications to upgrade the system.
- **Regional Data Processing:**
A project proposal regarding the development and implementation of the Regional Data Processing Strategy developed during the fiscal year was approved by the Systems Review Board.
- **Waste Site Information System:**
Phase I of the system, concerning waste site descriptions, was implemented.
- **Industrial Liquid Waste Waybill System:**
Several new report formats were added to the system as well as a new selection method.

constructive actions by managers within the Ministry in accordance with their responsibilities and authority.

During the fiscal year the branch carried on with the implementation of the comprehensive auditing program, and continued its multi-year program of conducting operational and financial audits in the Ministry offices and plants throughout the province.

In addition, during 1980-81, over 300 audits were performed on three Grant Programs administered by the Ministry of the Environment, namely the C.S.C.P. Grant Program, the Up-Front or Direct Grant Program and the Private System Grant Program. These programs were designed to provide financial assistance to municipalities and agencies for sanitary and water system projects throughout the entire Province. The total expenditure for these grants for the fiscal year 1980-81 was \$59.5 million.

Information Services Branch

Director: R.J. Frewin

The Information Services Branch provides a full range of communications and public information services aimed at keeping the public informed of the Ministry's policies and activities. During the year, the Branch produced and distributed 110 news releases, 36 statements and speeches and a wide range of publications, reports, newsletters and both printed and audio-visual educational materials.

Major publications produced during the year included a brochure on acid rain entitled "The Case Against the Rain" and the three annual volumes of "Guide to Eating Ontario Sport Fish", which have been published since 1978.

The acid rain report describes the extent to which Ontario is affected by acid rain, the programs the Province has underway to meet the challenge and addresses the need for action both in Canada and the U.S. to curb acid rain pollution. Copies of the report were distributed widely throughout the U.S., particularly in the mid-west where major sources of acid rain exist and in the north-east where significant acid rain effects have been measured.

The fishing guides, which cover fish species in Northern, Southern Ontario and the Great Lakes, were revised to include the latest test results. This is the fifth consecutive year that the results have been published as part of Ontario's fish testing program conducted in co-operation with the Ministry of

Internal Audit Branch

Director: E.F. Heath

The Internal Audit Branch is a central support function responsible for providing management with objective assessments of the financial and management controls under which Ministry programs and activities operate.

With the introduction of the comprehensive auditing concept, approved by the Central Agencies in late 1980, the branch commenced planning to implement this new approach so as to extend the audit scope to cover operations more fully with respect to efficiency, effectiveness and economy.

The major audit responsibilities are as follows:

- To identify and evaluate the adequacy of financial and administrative control aspects of Ministry operations;
- To determine the accuracy of claims from outside agencies and municipalities with respect to grants and transfer payments;
- To assist management by performing an independent review of any area of special concern;
- To communicate findings, suggestions and recommendations in a manner which will encourage and support corrective and/or

Natural Resources. The guides contain analysis for possible trace contaminants such as mercury, PCB, mirex and DDT. More than 54,000 fish from 878 Ontario water bodies have been tested and reported to date. Monthly bulletins on test results are also issued.

Five issues of the Ministry newspaper, "Legacy" were published and distributed to about 20,000 subscribers.

Major advertising activities during the year included a print campaign in support of the Ontario Federation of Anglers and Hunters "Pitch In" program; the Ontario fish testing program, and the "Stay Beautiful Ontario" broadcast campaign.

Special Projects

As a result of continuing problems of discharges of liquid manure into streams causing major kills of fish, a public information/education program was directed at farmers on the seriousness of the problem and the measures necessary to bring it under control.

"Operation Skywatch", utilizing the volunteer services of 85 women pilots, was conducted for the third year. The pilots, members of the Ninety-Nines Inc., an international organization, flew environmental patrols along the shoreline of the Ottawa River, St. Lawrence River and the Great Lakes, as part of an environmental detection activity.

Displays and Exhibits

The Ministry maintained exhibits at the Canadian National Exhibition in Toronto, the International Plowing Match at Woodstock, the Do-It-Yourself Show in Toronto and exhibitions in Sault Ste. Marie, Thunder Bay and Ottawa. An estimated audience of over 150,000 people visited these major exhibits. In addition, the Ministry also participated in eight smaller exhibits.

Public Meetings

Information "open houses", citizen information committee meetings, public meetings and project-oriented community education programs were conducted throughout the Province, largely as part of the Ministry's programs concerning acid rain and industrial waste facility proposals. During the year, 20 such meetings attended by over 4,000 people were held.

The Branch also co-ordinated the official opening ceremonies for 11 sewage and water treatment systems across the Province.

Education

Under the Ministry's Environmental Explorations Program, four university students visited 128 schools,

resident camps and provincial parks across Ontario. The program which runs for 14 weeks during June, July and August, is designed to promote an interest and a concern for our environment and to provide appropriate information to both children and adults. Approximately 45,000 people were reached directly and indirectly through the program.

For the fourth year, the Ministry sponsored an environmental workshop for special education teachers at the Bolton Outdoor Education Centre. Sixty-six teachers attended the three-day workshop, staged under Ministry auspices, by instructors and session leaders from outdoor education centres, conservation areas, universities and boards of education.

The 27th Ontario Industrial Wastes Conference, which was attended this year by over 600 delegates, was also a major public education event.

Films/Photography

Ministry films were used in 1,382 showings before a total audience of 46,854 persons. In addition, four films were booked for 61 showings on television, to a total audience estimated at 762,000.

Library Services

Library Services operates a main library at the head office in Toronto and the library at the main laboratory on Resources Rd., Rexdale. Library staff responded to 15,229 reference requests, lent 25,428 books and processed 51,472 photocopies of information material in 1980-81. The libraries acquired 1,200 technical books and documents, subscribed to 227 journals which were widely circulated to Ministry staff, conducted 1,384 computer searches for scientific material, and acquired 3,242 U.S. Government documents on microfiche.

The public reading room was opened at the main library during the year and was used by over 1,660 people, most of whom were engaged in research.

Personnel Services Branch

Director: R.E.B. Burns

Personnel Services Branch designed the necessary framework for a manpower planning program within the Ministry.

Occupational Health and Safety Committees were established in co-operation with the Union, in designated areas of the Province to meet the requirements of the Occupational Health and Safety Act. The committees met on a regular basis to review matters of mutual interest.

The Training and Certification Section conducted 67 courses, workshops and seminars which were attended by 671 Ministry and 1,217 non-Ministry personnel. Thirty-three trainees were from Provinces other than Ontario and 25 were from abroad. Sixty-two Ministry personnel were recertified and five Ministry and two non-Ministry personnel obtained initial certification in the identification of opacities of visible emissions. Fourteen Ministry and 14 non-Ministry personnel were certified as Noise Control Officers Class 2, having completed parts 1 and 2 of the Acoustics Technology Course. New workshops added to the program included storm-water management, instructor seminar, environmental assessment seminar, a wood-burning seminar and an environmental investigators course.

During the same period, the Ministry ran three management development courses for 60 staff members.

The Ministry also established targets for the staffing of positions by women in those categories which were considered to be under represented. Targets for all categories were either met or exceeded during the fiscal year.

Currently, 50 per cent of general information publications are available in French, including literature pertaining to major environmental issues, such as acid rain. Translations of the Ministry's legislation are underway. Audio-visual materials are also produced in French.

The openings of the Hearst, Blind River and Killaloe treatment plants were conducted in both French and English. Four of the Ministry's exhibits were bilingual and French-language radio commercials were broadcast as part of the "Stay Beautiful, Ontario" campaign.

French Language Services

Co-ordinator: N. Vakharia

The goal of French Language Services is to ensure provision of a full-range of Ministry services in areas of the Province where there are significant concentrations of French-speaking Ontarians.

Currently, bilingual staff are situated in Ministry offices located in: Cornwall, Ottawa, Peterborough, Stoney Creek, Sudbury, Timmins and Toronto. In 1980-81, 26 employees participated in french language training.

boards and commissions

Waste Management Advisory Board

Chairman: R.H. Woolvett

The Waste Management Advisory Board was established in 1975 by Order-in-Council to provide advice to the Minister of the Environment on matters relating to the management of waste in Ontario, with particular emphasis on the means of reducing waste generation and recovering valuable materials from the waste stream.

The board's terms of reference are as follows:

- "to provide advice to the Minister on any matter which the Minister may refer to the Board in writing;
- "to provide comment or advice directly to the Minister on any matter of high public concern in the short, medium, or long term related to the reduction and management of wastes in Ontario;
- "to review and advise the Minister directly on the priorities or action by the Province in the total area of waste management, and also
- "to comment on the effectiveness of existing waste management programs and activities."

During the fiscal year of 1980-81, the Waste Management Advisory Board comprised 11 members. Nine board meetings were held over a period of 18 full days. In addition, 36 meetings were held by seven board committees.

On December 5, 1980, Mrs. Diana Pilsworth was appointed Vice-Chairman of the board by Order-in-Council.

New Programs

In the area of source separation, a project was assigned to a consulting firm to set up a system to monitor the supply and demand for recyclable materials; a funding program to aid in the implementation of source separation projects was developed in conjunction with the Waste Management Branch; a pilot program to recover used motor oil from do-it-yourself oil changers was conducted for a second season in Kitchener-Waterloo, co-sponsored by the Waste Management Branch and Environment Canada; guidelines on how to recover oil from this

sector were also initiated; meetings were held with major users of old corrugated containers to discuss increased recovery from local sources; a study was commenced to evaluate the markets for waste glass and to determine mechanisms for increasing the use of this material.

In the packaging area, the board and the Ministry launched the second biennial student packaging design competition and developed a slide show for use in post-secondary schools; the board became a member of an Ad Hoc committee established to look at the methods of handling pesticides containers; on board initiative, the prohibition was lifted against the introduction of new types of refillable containers for milk; monitoring by the board of the milk packaging situation continued, as it did for carbonated soft drink containers.

In other areas, the board commissioned an update of Ontario figures for solid waste generation and composition; it initiated an educational program for schools, including the purchase of educational posters; it developed and forwarded to the Minister a position paper on the management of liquid industrial waste.

Two new board committees were formed; one on education and one on public participation.

The Environmental Assessment Board

*Chairman: K.H. Sharpe

The Environmental Assessment Board conducts public hearings on environmental issues under the following legislation and Orders-in-Council:

Legislation	No. of Hearings in 1980-81
The Environmental Assessment Act	1
The Ontario Water Resources Act	18
The Environmental Protection Act	10
Orders-in-Council	4

At the end of the 1980-81 fiscal year the Board had 16 members.

A detailed report on the Board's activities may be obtained by writing to the Board at 1 St. Clair Avenue West, Toronto, Ontario M4V 1K7.

**B.E. Smith was appointed Chairman on the retirement of K.H. Sharpe in October 1980.*

The Pesticides Advisory Committee

Chairman: Dr. G.S. Cooper

The Pesticides Advisory Committee recommended several changes to Ontario Regulation 618/74; reassessed 14 previously classified compounds, 10 of which were placed in Schedule 1; reviewed and evaluated the environmental impact, toxicity and hazard of four new or previously non-classified active ingredients; evaluated 210 newly registered pesticide products and recommended for each a classification for storage, sale and use in Ontario. The committee received 54 research proposals, 21 of which were funded by the Ministry through the committee at a total amount of \$199,270.

A two-day research seminar sponsored by the Ministry was held in January, 1981. The 75 delegates who attended were drawn from federal and provincial government agencies, universities, and the chemical industry.

Sixteen committee meetings were held during the year. In addition to the work surrounding the classification of pesticide products, the current

scientific data of a number of pesticide compounds were updated and evaluated, and all provincial publications dealing with pesticides were reviewed.

Farm Pollution Advisory Committee

Chairman: O. Crone

Consisting of four professional farmers, this committee provides objective assessments of farm environmental situations as requested by Ministry officials. The committee visits farms to investigate complaints and make recommendations concerning manure storage and spreading, cultivation, yard drainage and ventilation of livestock and poultry buildings.

In 1980, the committee investigated two hog farms, one cattle feed lot and one small mixed operation.

Rural land severances near livestock operations continued to be a major problem as operations became larger and some local residents objected to the associated odours. As in the previous year, manure discharge into watercourses was a major problem in some areas.

The Environmental Appeal Board

Chairman: L.C. DeGroot

Established under The Environmental Protection Act, 1971, the Environmental Appeal Board provides an appeal mechanism for persons affected by certain decisions made by the Ministry of the Environment or local health units. The board consists of 13 part-time members, including the Chairman, from various occupations and parts of the Province.

In 1980-81, the board received 39 valid appeals. Approximately 66 per cent of the appeals concerned

decisions of local health units on private sewage systems. The remaining appeals resulted from Ministry of the Environment decisions regarding waste disposal sites, waste management systems, waterworks and air pollution control.

The board held 40 days of hearings in 1980-81. It resolved 28 of the appeals received during the year as well as ten appeals from the previous year. At year-end, decisions remained to be issued, or hearings held, on nine appeals.

The Royal Commission on the Northern Environment

Chairman: J.E.J. Fahlgren

The Royal Commission on the Northern Environment has a mandate to study the effects of major enterprises north of the 50th parallel on the natural, social and economic environment, to investigate the feasibility of alternative undertakings, and to inquire into the application of the Environmental Assessment Act.

In 1980-81 the commission's emphasis and direction was based on two main aspects of fulfilling its mandate. One is to find a way to help guarantee that northern development takes place in harmony with and not at the expense of the residents and natural environment of northern Ontario. The other is to discover a mechanism to help ensure that northerners have a strong say in determining how the future of the north should proceed.

According to these directions, the commission initiated approaches wherein major sectors of the public could become involved in gathering and responding to information essential for fulfilling the commission's mandate.

A major research activity which complements this focus is a pilot study in northwestern Ontario undertaken in conjunction with the Kayahna Tribal Council. Its objective is to determine methods to assess and evaluate socio-economic impacts of development in the northern environment.

The commission is also investigating the effectiveness of the Environmental Assessment process by means of several case studies. Among the studies undertaken in 1980-81 on this matter were an investigation of the Detour Lake Access Road, of the proposed Onakawana lignite development, and of the nature and extent of public involvement in the West Patricia Land Use Planning process.

Two other projects were undertaken in the past year: a study of Indian education north of 50° parallel, and a project in conjunction with Fort Hope Reserve to anticipate the advantageous and detrimental effects of a road on the community and to make a sound decision on the matter.

As well, two studies begun the year before were well underway in 1980-81: a study of the economic future of forestry and related activities in Ontario north of 50° parallel and a study by Laurentian University examining the factors governing the prospects for mining development north of 50° parallel. Work continued on a geographical background study of the area which includes a description, analysis and atlas of natural resources, resource-using activities and settlement in Ontario north of 50° parallel; a separate atlas constitutes an interpretive summary of the geographical study's main findings.

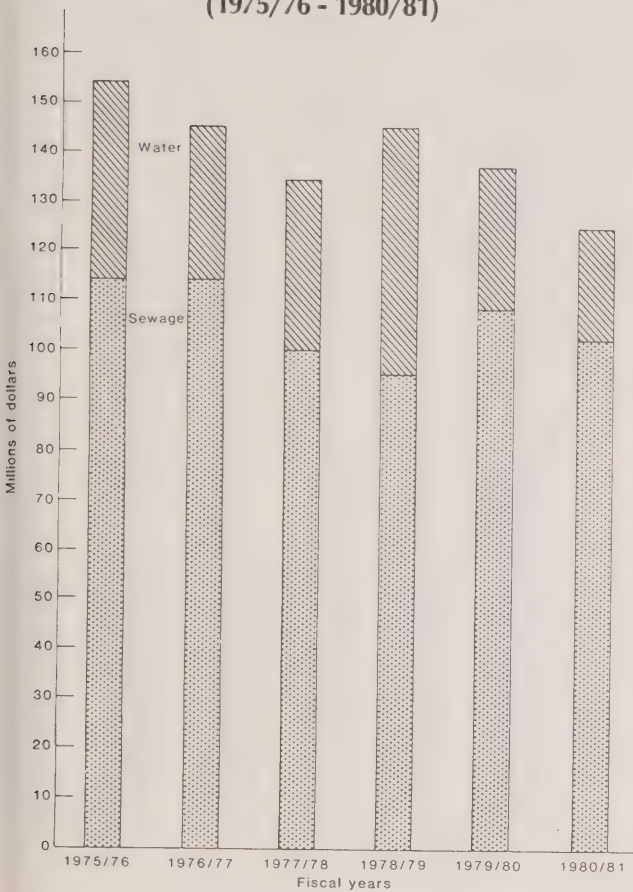
In the past fiscal year, under its Public Interest Subsidy program, the commission funded 46 projects in the amount of \$252,000 and published 28 reports of selected projects which are available and of interest to the public at large.

As part of its overall objective and main thrust, and an expanded Public Interest Subsidy policy, the commission began discussions with major segments of the public north of 50°, such as the Windigo and Pehtabun communities of Treaty #9, for funding arrangements to enable them to participate fully in the activities related to the commission's central concerns: controlled development and increased public involvement in decision-making.

appendices

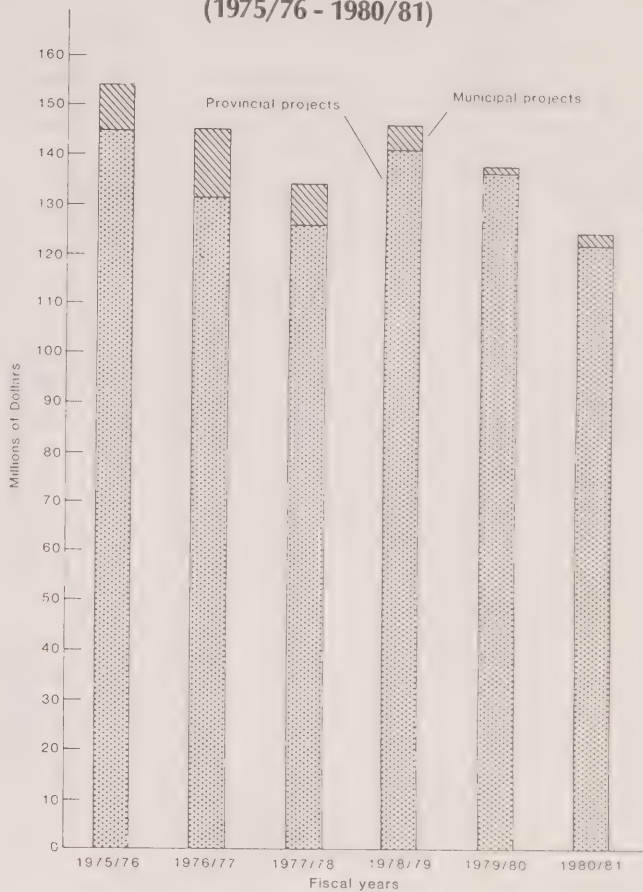
CAPITAL CONSTRUCTION PROGRAM

Annual Total Expenditure by Project Type
(1975/76 - 1980/81)



Graph 1

Annual Total Expenditure by Class
(1975/76 - 1980/81)



Graph 2

Annual Total Expenditure by Project Type

Fiscal Year	Sewage	Water	Total* (\$ millions)
1972/73	54.4	26.0	80.4
73/74	68.4	13.1	81.5
74/75	94.8	32.0	126.8
75/76	114.8	40.1	154.9
76/77	114.8	31.2	146.0
77/78	101.0	34.1	135.1
78/79	96.6	50.7	147.3
79/80	110.6	28.9	139.5
80/81	101.9	21.7	123.6

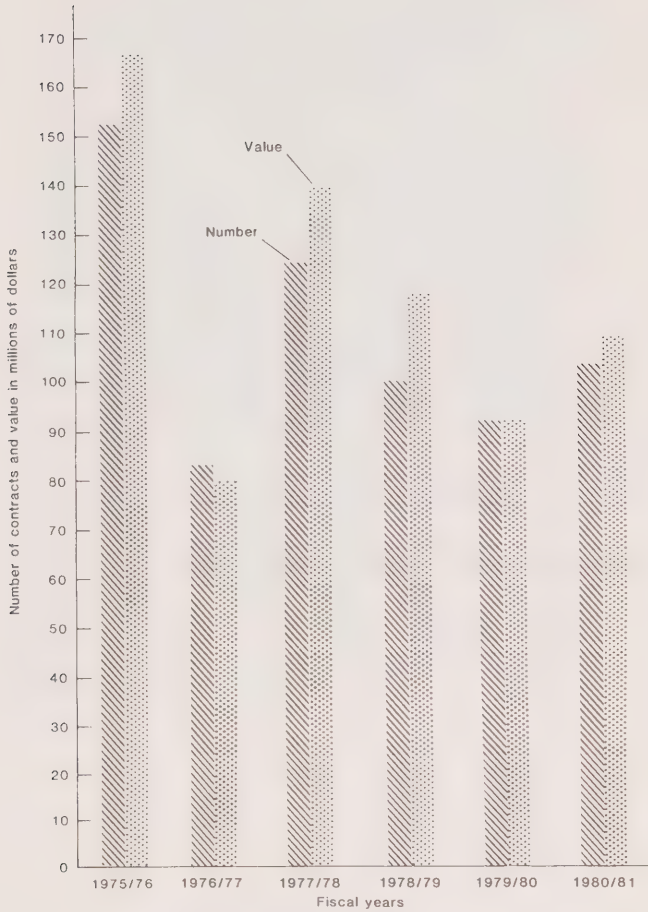
Annual Total Expenditure by Class

Fiscal Year	Provincial Projects	Municipal Projects	Total* (\$ millions)
1972/73	77.6	2.8	80.4
73/74	75.5	6.0	81.5
74/75	115.4	11.4	126.8
75/76	145.2	9.7	154.9
76/77	131.8	14.2	146.0
77/78	127.0	8.1	135.1
78/79	142.9	4.4	147.3
79/80	138.3	1.2	139.5
80/81	121.7	7.9	123.6

*Includes costs of engineering, property and miscellaneous items as well as contract prices.

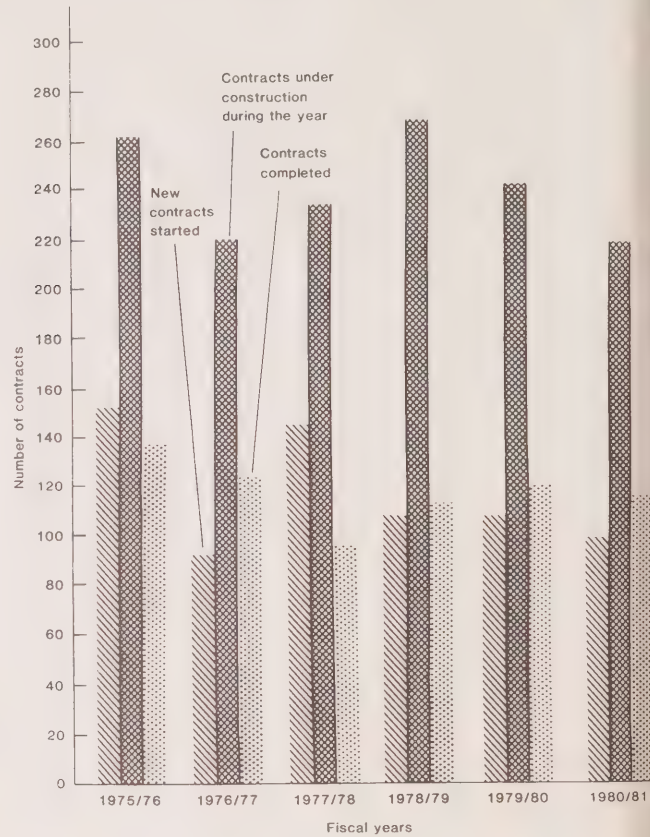
CAPITAL CONSTRUCTION PROGRAM

**Number and Value of Contracts Tendered Anually
(1975/76 - 1980/81)**



Graph 3

**Annual Volume of Activity
(1975/76 - 1980/81)**



Graph 4

**Number and Value of Contracts
Tendered Annually**

Fiscal Year	Number	Value (\$ Millions)
1972/73	99	72.4
73/74	108	91.3
74/75	92	84.1
75/76	153	167.6
76/77	84	79.6
77/78	125	140.5
78/79	99	116.3
79/80	93	93.0
80/81	104	110.2

Annual Volume of Activity

Fiscal Year	Started	(Number of Contracts) Under Construction	Completed
1972/73	88	166	92
73/74	108	182	82
74/75	102	202	93
75/76	153	262	139
76/77	92	215	124
77/78	145	236	96
78/79	109	249	115
79/80	110	244	122
80/81	97	219	113

**NORTHWESTERN REGION
SEWAGE AND WATER WORKS
COMPLETED IN 1980-81**

Location	Project	Value (in dollars)
Rosspoint	water intake/pumping station/ chlorination/distribution system	\$389,000
Rainy River	water filtration plant	125,672
Atikokan	sewage treatment plant, including phosphorus removal, pumping stations and major trunk sewers	2,367,604
Longlac	expansion of sewage treatment plant	555,299
Nakina	sewage treatment plant, including phosphorus removal, pumping stations and collector system	359,247
Red Lake	extension of water distribution and sewage collector systems	250,971
Sioux Lookout	phase 1 completion of waterworks project, construction of major trunks across town	159,972

**NORTHEASTERN REGION
WATER AND SEWAGE PROJECTS
COMPLETED IN 1980-81**

Location	Project	Value (in dollars)
Township of Temagami	new water plant	\$225,000
	new sewage plant	250,000
City of North Bay	new pump in water pumphouse	1.4 million
Sturgeon Falls	new trunk watermain system	1.2 million
South River	new well	120,000
Chapleau	renovations to sewage treatment plant	25,000
Town of Onaping Falls	new water and sewage services	2.8 million
Town of Rayside Balfour	new water storage tank	.5 million
Town of Valley East	extension to water supply system	1.8 million
Township of Casimir, Jennings and Appleby	new sewage treatment lagoon and sewers	1.1 million
Town of Gore Bay	new lagoon, pumping stations and sewers	2.4 million

**SOUTHEASTERN REGION
WATER AND SEWAGE WORKS
COMPLETED IN 1980-81**

Location	Project	Value (in \$ millions)
Village of Iroquois	expansion of sewage treatment plant	\$1.24
City of Brockville	expansion of plant for phosphorus removal	1.3
Village of Wellington	waste treatment plant and sewer collector system	4.5
Village of Cobden	waste treatment plant	
Town of Hawkesbury	plant modernized and upgraded	1.0
City of Brockville	installation of filtration facilities	1.8
Township of Gloucester	installation of water distribution system	2.15

**WEST CENTRAL REGION
WATER POLLUTION CONTROL PROJECTS
COMPLETED IN 1980-81**

Location	Project	Value (in dollars)
City of Guelph	plant expansion including nitrification & filtration	\$6 million
Town of Shelbourne	new plant including tertiary treatment	2.5 million
Village of St. George	new plant and sewers	2.4 million
City of Brantford	expansion of a secondary treatment plant	10.5 million
Village of Elora	plant expansion and sanitary sewers	3.5 million
Port Colborne	secondary sewage treatment plant	5 million
St. Williams	upgrading and expansion of water works	105,000

**CENTRAL REGION
WATER AND SEWAGE FACILITIES
COMPLETED IN 1980-81**

Location	Project	Value (in dollars)
Township of Mara (Fern Resort)	completion of seasonal discharge lagoon	\$58,000
Metro Toronto		
1) Humber Sewage Treatment Plant	plant expansion	13.5 million
2) Highland Creek Sewage Treatment Plant	plant expansion	13 million
3) Easterly Plant	water filtration plant	66 million
Town of Brock	new plant and extension of lagoon system	2.5 million
Town of Pickering Duffin Creek Sewage Treatment Plant	new plant	8 million
Burlington Water Plant	upgrading program	4.47 million

**SOUTHWESTERN REGION
WATER AND SEWAGE PROJECTS
COMPLETED IN 1980-81**

Location	Project	Value (in dollars)
Village of Neustadt	complete collection and treatment system	\$1.17 million
City of Woodstock	expansion of secondary sewage treatment facilities and the addition of nitrification	3.5 million
Town of Parkhill	sewage works and collection system	3.5 million
Township of Blandford-Blenheim (Village of Plattsville)	sewage works utilizing a seasonal retention lagoon	2.3 million
Township of Anderdon	sewage collection system and a seasonal retention lagoon	3.57 million
Town of Petrolia	expansion of sewage collec- tion and treatment works	9.2 million
Village of Thedford	sewage collection and treatment works utilizing a lagoon	1.8 million

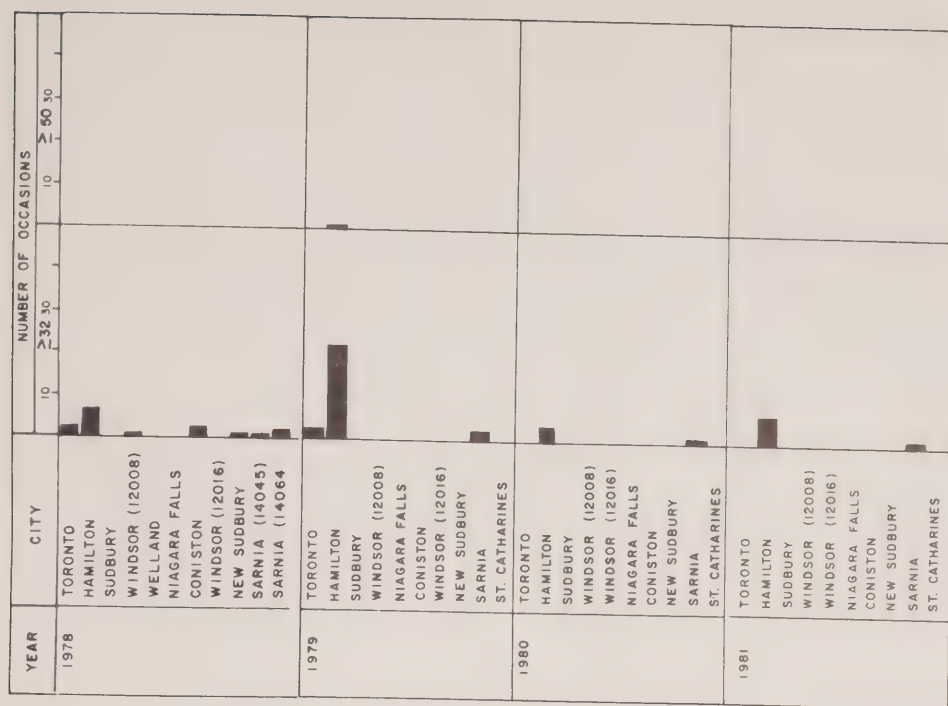
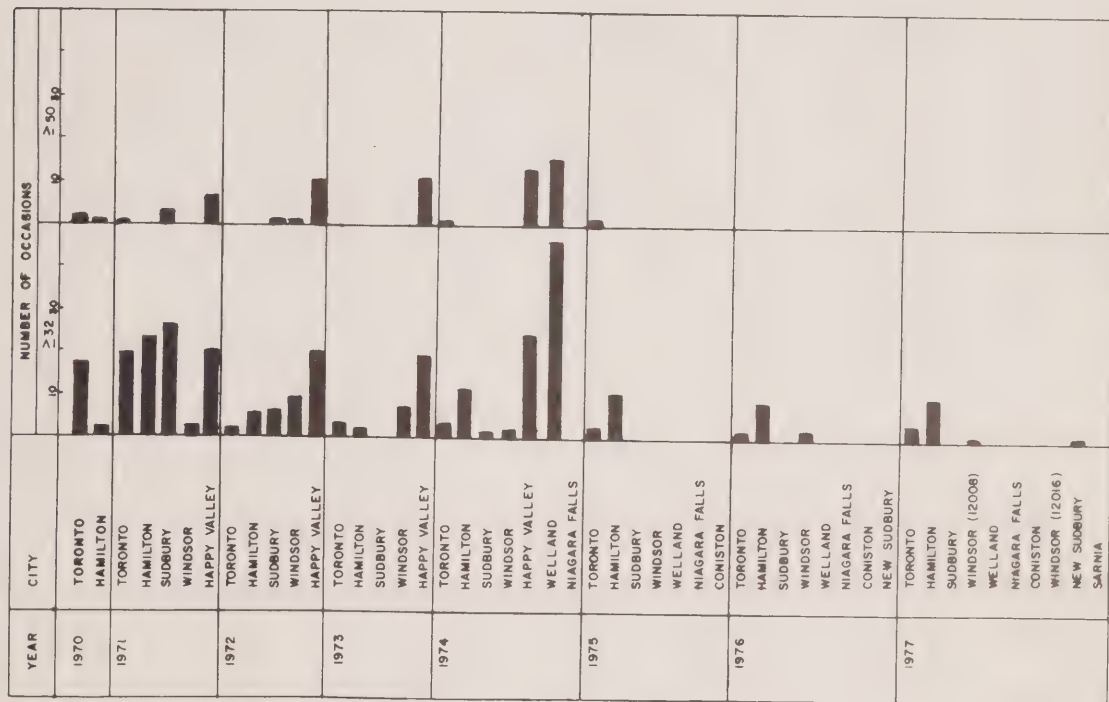
SOUTHWESTERN REGION Cont'd

Location	Project	Value (in dollars)
Village of Wyoming	sewage treatment and collection works	\$3.7 million
Township of Moore	collection system	1.2 million
Township of Blandford-Blenheim	provincial project to supply and distribute water	1.2 million
Town of Walkerton	well	48,000
Village of Tara	well	50,000
Town of Seaforth	two wells	59,000
Township of Stephen (Dashwood)	watermains and a connec- tion to the Lake Huron Water Supply System	838,000

DATE STARTED

TORONTO MARCH 23, 1970
HAMILTON JUNE 15, 1970
SUDBURY JANUARY 16, 1971
WINDSOR MARCH 19, 1971
HAPPY VALLEY MAY 13, 1971
(CLOSED JAN. 1975)

WELLAND JAN. 1, 1974 (CLOSED OCT 26, 1978)
NIAGARA FALLS NOVEMBER 1, 1974
CONISTON FEBRUARY 18, 1975
NEW SUDBURY MARCH 1, 1976
SARNIA (14049) DEC. 1, 1977 (CLOSED AUG. 30, 1978)
SARNIA (14064) SEPTEMBER 1, 1978
ST. CATHARINES SEPTEMBER 14, 1979



Annual Report 1981-1982

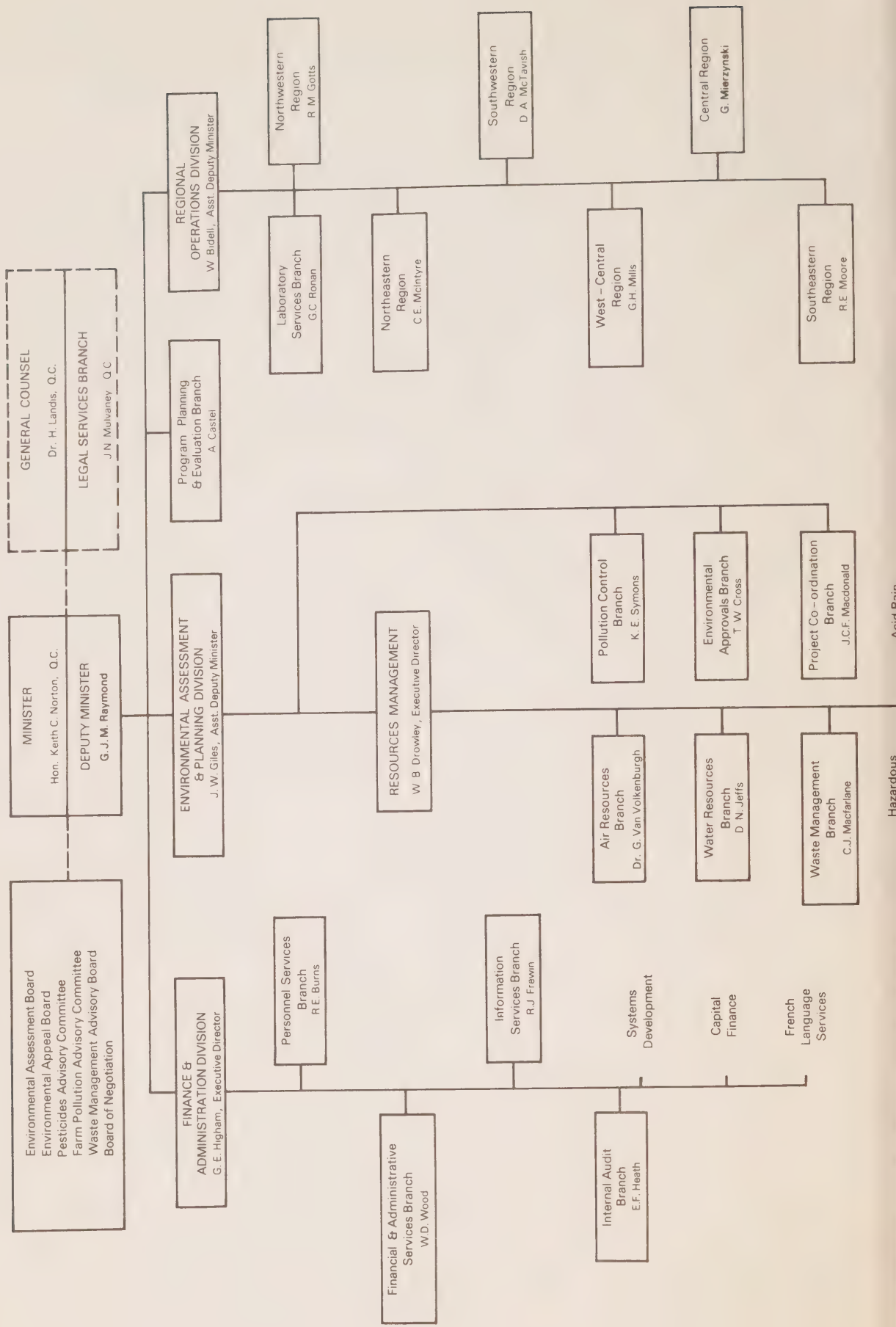
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Ministry
of the
Environment

MINISTRY OF THE ENVIRONMENT – April 1, 1982



contents

Organization Chart	Frontispiece
Letters of Transmittal	2
Minister's Message	3
Highlights	5
Deputy Minister	9
Program Planning and Evaluation Branch	9
Legal Services Branch	10
Environmental Assessment and Planning Division	11
Air Resources Branch	11
Water Resources Branch	13
Pollution Control Branch	17
Environmental Approvals Branch	19
Project Co-ordination Branch	20
Waste Management Branch	23
Hazardous Contaminants Office	24
Acidic Precipitation in Ontario Study Office	24
Regional Operations and Laboratories Division	27
Northwestern Region	27
Northeastern Region	31
Southwestern Region	32
West Central Region	34
Central Region	36
Southeastern Region	39
Laboratory Services Branch	41
Finance and Administration Division	43
Financial and Administrative Services Branch	43
Capital Financing Office	44
Systems Development	44
Internal Audit Branch	44
Information Services Branch	44
Personnel Services Branch	46
French Language Services	46
Boards and Commissions	47
The Waste Management Advisory Board	47
The Environmental Assessment Board	48
The Pesticides Advisory Board	48
The Farm Pollution Advisory Committee	48
The Royal Commission on the Northern Environment	48
The Environmental Appeal Board	49
Appendices – Charts and Tables	51
Capital Construction Program	51
Water and Sewage Projects Completed in 1981-82	53
Retirements	57
Ontario's Air Pollution Index	58

Ce rapport est également publié en français. On peut en obtenir un exemplaire en s'adressant à la librairie du gouvernement de l'Ontario ou aux bureaux régionaux ou de district du ministère de l'Environnement.



To:
The Honourable
Keith C. Norton, Q.C.
Minister.

Sir,

I have the honour to submit
for your approval the annual
report of the Ministry of the
Environment for the year
1981-82.

Respectfully submitted,

Gérard J.M. Raymond,
Deputy Minister.



To:
His Honour,
The Lieutenant-Governor
of the Province of Ontario.

May it Please Your Honour,

I have the privilege to present
the annual report of the
Ministry of the Environment
for the fiscal year beginning
April 1, 1981, and ending
March 31, 1982.

Respectfully submitted,

Keith C. Norton, Q.C.
Minister.

Minister's Message

The Ontario Ministry of the Environment was established on April 1, 1972 when the various units of environmental protection, which then existed, began operations under one administrative roof.

As the Ministry begins its second decade, it is my privilege to serve the people of Ontario as the Minister of the Environment. As I look back over the first ten years of our Ministry, I acknowledge, with great appreciation and pride the contributions made to environmental protection by my predecessors, James A.C. Auld, George C. Kerr, William G. Newman, George P. McCague and Dr. Harry C. Parrott.

Under their leadership, this Ministry and its staff made substantial advances in many areas, including these milestones:

- the air quality of major cities throughout the Province has substantially improved as a result of Ministry abatement activities;
- more than 95 per cent of Ontario residents are now served by water and sewage treatment control plants and enjoy an unlimited supply of good safe drinking water;
- solid wastes are now disposed of in an environmentally acceptable manner and we are seeking the means of reducing our dependency on landfill by improved recycling; and,
- rapid strides have been made in the scientific field as our knowledge and detection capabilities have expanded dramatically.

To-day, the Ministry measures some contaminants in parts per trillion — a million times more sensitive than detection levels of ten years ago. As a result, we are able to identify potentially harmful substances in minute amounts.

But along with our successes, the Ministry has identified new areas of environmental concern, which now require a major concentration of our resources. These concerns are associated mainly with chemicals, the consequence of our heavy industrialization and consumer-oriented life style.

Over 100,000 man-made chemicals have entered the manufacturing stream since World War II and 1,000 new chemicals are produced each year.

The control and safe disposal of these chemicals to prevent their discharge into our environment are major challenges of the 1980's.

Ministry staff are making significant progress in this area. A comprehensive plan for waste management has been developed and is being circulated for comment. It encompasses solids, liquids, industrial wastes and spills and will result in changes in legislation. These will be introduced in detail in a "Blueprint for Waste Management" in June of 1983.

Our waste management programs which are already in place include an improved waybill system for the transfer of industrial wastes and a special environmental investigative unit to monitor and enforce existing regulations.

Another major challenge is the chemical contamination in the Niagara River and the great need to continue and improve clean-up programs on this environmental frontier.

In 1981, through our fish testing program, we detected levels of dioxin in the fish caught in the River.

Surveillance programs indicate that this contamination stems from industrial waste dumps on the American side of the River and that it is continuing to enter our waters from these sources.

We have also conducted intensive testing on the drinking water supplies of the Niagara River and Lake Ontario. I am happy to report that dioxin has not been found in any water sample. Our extensive testing for a variety of other contaminants confirms that drinking water from the Niagara River is safe and of good quality.

However, I am concerned about the potential long-term effects of the discharges of wastes to the Niagara River from the U.S. industrial complex and on the impact this pollution may have on Lake Ontario.

That is the reason, I established a special scientific group — the Niagara River Improvement Team — to spearhead the Ministry's efforts to monitor the River, to keep abreast of activities in the U.S. and to participate in all possible pollution control actions undertaken in New York State and by international agencies in which Ontario participates.

We are continuing our efforts to ensure that Ontario industrial and municipal discharges do not add to the pollution load in the Niagara River.

Acid rain, of course, is a third major environmental problem of the 1980's.

This phenomenon is having severe effects on the natural environment, particularly on our lakes, rivers, fisheries and vegetation.

Since 1979, when the Acidic Precipitation in Ontario Study (A.P.I.O.S.) was established to investigate the phenomenon we call acid rain and the long-range transport of air pollutants, a complex research program has been developed to determine sources, deposition, effects and feasible abatement actions. In the 1981-1982 fiscal year, we spent \$7 million on this program and we anticipate that our spending will increase by \$2 million during the current fiscal year.

Research activity has focused on atmospheric, aquatic and terrestrial factors and we are also conducting studies into socio-economic effects.

I am particularly proud of the statistical model developed by A.P.I.O.S. scientists which is unparalleled by any agency elsewhere. This model is designed to provide accurate assessments of emissions of oxides of sulphur and nitrogen as well as an updated inventory of emissions.

While most of the A.P.I.O.S. resources are devoted to research, we will continue our major support of the Canadian effort to persuade U.S. administrators and environmental officials to take effective measures against the transboundary and long-term factors

involved in airborne pollution and the threat of acid rain to the environment of both countries.

Ontario has also taken effective steps to reduce its contribution to the acid rain problem. Stringent control measures have been introduced to deal with Ontario's two major sources of acid precipitation, Inco. Ltd., and Ontario Hydro. In addition, we are exploring possible abatement programs for other Ontario sources.

Our goal is to reduce emissions of sulphur and nitrogen gases to levels which will no longer threaten or damage our environment.

There is no doubt that acid rain, the Niagara River and chemical contamination are major environmental threats and that they are indicative of the new concerns facing the Ministry in the 80's. To meet them, Environment Ontario has shifted its emphasis to meet the need. More resources are being channeled to cope with the new forms of pollution, to assess risks and to deliver regulatory programs as required.

To facilitate this change in focus and to ensure that staff have the support necessary to enable us to deal with the challenges of the 80's, the Ministry has reorganized its resources. Our new structure, announced in the spring of 1982, is being implemented as quickly as possible throughout the fiscal year, 1982-83.

The reorganization of the Ministry demonstrates our determination to fulfill our mandate to protect public health and the environment by meeting the new factors which have emerged as the possible environmental hazards of the 1980's.

Keith C. Norton, Q.C.
Minister of the Environment

Highlights of the 1981-82 Fiscal Year

The 1981-82 fiscal year was one of transition for the Ministry of the Environment. During the 1960's and 1970's Ministry efforts were primarily directed towards control of traditional pollutants, which are now largely regulated and will basically only require the maintenance of existing programs. Ontario's investment in water and sewage treatment facilities have paid large dividends in the protection of our waterways and drinking water. Air pollution control measures have significantly improved the air quality of the Province. Solid waste disposal practices have improved markedly.

However, an increasing awareness of potential health effects and the environmental impacts of many pollutants presents a new set of challenges. For instance, a number of pollutants now of concern could previously not be identified at very low concentrations. The Ministry also has rising concern over diffuse or hard to control sources of pollutants that were not previously regulated.

These new circumstances led the Ministry to reconsider its corporate mandate. As a result, in 1981 the Ministry adopted the following goal statement:

"To achieve and maintain a quality of the environment – including air, water and land – that will protect human health and ecosystems and will contribute to the well-being of the people of Ontario".

To meet these newly recognised needs and to put greater focus on the regulation of discharges to the environment, the Ministry required an improved and future-oriented organization.

In the spring of 1982, after several months of careful deliberation and planning the Ministry announced a major restructuring of its organization. This will take place throughout the 1982-83 fiscal year.

But this was not the only major occurrence of 1981-82. Many significant developments took place in Ministry programs, which are briefly summarized:

Water and Sewage Services

A large part of the Ministry's budget involves the provision of grants and support to municipalities to enable them to provide adequate services for the protection of the local environment and public health. The support includes financial subsidies and long-term loans, grants, project management, technical advice and, in some cases, operation. In recent years, the Ministry has encouraged municipalities to assume

responsibility for the operation of their facilities, if they are capable of doing so.

Through the Ministry's direct grant program which assists municipalities in the construction of water and sewage works, more than \$80 million was provided to municipalities throughout the Province in 1981-82.

Approximately 46 sewage and water treatment facilities were completed and many others are still in construction or planning stages. In addition, the Ministry operated over 300 Provincial water and sewage plants servicing over 200 municipalities.

The Ontario Waste Management Corporation

The Ontario Waste Management Corporation was established as a Crown Agency to develop and manage the operation and facilities which will meet Ontario's long term liquid and hazardous industrial waste treatment and disposal needs. With over 60 million gallons of hauled liquid industrial waste generated annually, the need for new facilities is urgent.

In the fall of 1981, it was determined that the proposed site for the facility in South Cayuga was unsuitable. The Corporation is now investigating alternative sites for detailed study and consideration of the Hearing Panel.

The Corporation is also conducting an information program to keep the public informed of all aspects of its work.

Waybill System

To control the transportation of hauled liquid industrial wastes throughout the Province, the Ministry developed a fully computerized waybill system, which permits government monitoring and checking of every load moved for disposal.

In addition, the Ministry is revising regulations to ensure even greater public safety and is working on requirements for driver training and carrier bonding. The responsibility of the carriers and the generators of waste materials as well as carrier standards will be detailed. To complete the waybill system, a sixth copy of the form will be required for the receiver of waste to return to the generator. In future, the Ministry plans to require the registration of all generators of the wastes.

Enforcement

In January of 1981, a Special Investigations Unit (SIU) of 13 specially trained investigators was established to crack down on the illegal dumping of industrial wastes and other unusual forms of pollution. The Unit is supported by amendments to Ministry regulations, which have established fines for the illegal handling and dumping of industrial wastes and which empower the Ministry to seize vehicles involved in such activity.

In its first year of operation, the Unit was involved in 213 investigations and assisted environmental officers in 115 others. In addition, they conducted 88 surveillances and investigated the operations of 1,029 transporters of liquid industrial waste.

Identification of Old Waste Sites

Another of Environment Ontario's major waste management programs concerns the identification of old waste sites in Ontario. These former sites, many of them buried and abandoned were closed before the Province took over waste management a decade ago. To date 1,451 closed sites have been identified and rated according to their former use.

After the initial inventory, 197 sites were marked for further study. Following this, Ministry staff required corrective measures on two sites by the municipalities concerned. Additional monitoring was carried out at 91 sites and 14 required additional study which is now underway.

Another study is under way to evaluate the use of remote sensing techniques to identify former waste disposal sites and facilities, as well as to monitor their environmental impacts. A multi-modular data processing system is also under development by the Ministry for storing information on all waste disposal sites.

Following Environment Ontario's leadership in the investigation of closed waste sites, the federal government proposes to launch a joint program to assist other provinces in undertaking such inventories and monitoring.

Source Separation Programs

The Source Separation Program, announced in August, 1981, offers financial and technical assistance to municipalities or private companies to implement new multi-material recycling projects or to expand existing ones. Guides, information sheets and promotional materials have been developed to assist

project operations under the general promotional umbrella of "Be A Good Sort". Financial support has been committed to projects in Halton Region, Niagara Region and Richmond Hill. The two projects in Halton and Niagara also provide employment opportunities for the handicapped.

Laboratory Services

Many of Environment Ontario's programs depend on the efficient and effective services of its laboratories in Rexdale, Thunder Bay, Kingston and London.

In October of 1980, a new dioxin laboratory was opened at the main laboratory in Rexdale. This facility provides Ontario residents with an extra measure of environmental protection as it enables the Ministry to test for dioxin in both fish and water samples.

During the 1981-82 fiscal year, a new mass spectrometer, costing \$300,000, was installed. With this equipment and with newly improved testing techniques, Environment Ontario's scientists can now detect a range of types of dioxin at levels of two parts per trillion (ppt) in fish and to 0.02 ppt in water. This represents a five-fold reduction in detection limits within a very short time.

Furthermore, a method was developed to monitor viruses in raw sewage and effluent samples. This capability is being extended to bring methodology on-line to analyse for the presence of viruses in drinking water supplies.

The bio-hazards laboratory underwent a \$400,000 expansion. The Unit is currently completing method development work to complement the existing Ames test capability. This will strengthen the lab's ability to isolate and detect mutagens (agents of genetic damage) present in the environment.

In addition, the main lab completed extensive method development work to establish a priority pollutants analytical protocol. This new capability allows the Ministry to selectively monitor surface water and drinking water supplies for over 120 parameters, 80 of which relate to trace organic contaminants. With this system, the Ministry now possesses one of the most extensive analytical capabilities available anywhere to assess the quality of Ontario's drinking water supplies.

Acidic Precipitation

Since 1979, when the Acidic Precipitation in Ontario Study (APIOS) was established to investigate acid rain and the long range transport of air pollutants

a complex research program has been developed to determine sources, deposition, effects, and feasible abatement actions. In the 1981-82 fiscal year, \$7 million was spent on this program.

During the year, Ministry scientists developed and validated a statistical model for estimating the total deposition of sulphur throughout the Province. In the 1982-83 fiscal year, this model will be expanded to include oxides of nitrogen (NO_x).

The monthly and event deposition monitoring networks were expanded to include 60 locations. These stations will continue to monitor wet and dry depositions, airborne particular matter and gaseous sulphur and nitrogen.

The cumulative monthly network will assist in determining acid loadings in various areas in Ontario; whereas the event or daily network will assist in linking specific emission sources to receptor areas. The monitoring of other airborne pollutants, such as dissolved sulphur dioxide (SO₂), mercury and organics, will soon begin at a limited number of sites.

Aquatic, terrestrial and socio-economic studies continued throughout the year (see Acidic Precipitation in Ontario Study Office).

The Aquatic Effects Study focused its activities primarily around the Ministry's research facility at Dorset, which was expanded during the year.

Ontario has also taken major steps to reduce its own contribution to the acid rain problem.

The Ministry has ordered Inco Ltd. and Ontario Hydro to cut back their sulphur emissions. Inco is acknowledged as the largest single point source of sulphur emissions in North America. Ontario Hydro with its coal-fired plants is Ontario's second largest source. The Ministry's goal is to reach the level of emissions our environment can tolerate without suffering.

Because of the international scope of the problem, Ontario has been working very closely with the federal government and other provincial governments to examine the problem and to propose various abatement strategies. In February 1982 during recent negotiations in Washington, D.C., Canada put forward a proposal which calls for a 50 per cent reduction from current levels of acid gas emissions by both the United States and Canada. Ontario is on record as endorsing this position. The Ministry is prepared, if the United States agrees to this percentage reduction, to sit down with the federal government and the provinces concerned to negotiate Ontario's portion of the reductions required to meet Canada's overall commitment to the 50 per cent decrease.

Without a commitment from the United States similar to the one Canada is prepared to make, Ontario cannot win the fight against acid rain. The Ministry anticipates a resumption of negotiations later this year. In the interim, the working groups established under the Memorandum of Intent, in which Ontario is an active participant, will continue to provide information to assist in the preparation of a bilateral agreement to address the problems of the long-range transport of air pollutants.

The Ministry has also been involved in a series of legal interventions with the U.S. Environmental Protection Agency. For more information on this and on the Ministry's "visits" program conducted for U.S. legislators and journalists, see the main body of this report.

Niagara River

The Niagara River is the single largest tributary source to Lake Ontario. Although treated drinking water from the River is safe and of high quality, the Ministry has detected the presence of contaminants in some species and sizes of fish in the River. These contaminants do not break down in the River and have the ability to accumulate in plant and fish life.

Ministry scientists have conclusive evidence that the contamination originates from the chemical complexes and the disposal sites on the U.S. side of the River.

Obviously, the chemical sources in the United States must be cleaned-up and must come under tighter control. Ontario is pressing New York State and the U.S. agencies for immediate action on this problem. For its own part, the Ministry has established a special Niagara River Improvement Team to lead the Ministry's efforts to monitor the River, to follow activities in the United States closely, and to participate in all possible pollution control actions in New York State.

The Improvement Team, working in conjunction with the staff of the Ministry's West Central Regional Office will also continue to work with the inter-agency Niagara River Toxics Committee. The Committee has developed a comprehensive monitoring program designed to identify sources of toxic pollutants, assist with the development of control programs, and determine the effectiveness of abatement strategies.

The Ministry is making particular efforts to ensure that Ontario industrial and municipal discharges are not adding to the pollution load in the Niagara River. These discharges are monitored regularly to ensure they comply with Provincial standards.

Because of increasing public concern for the safety of the water supply at Niagara-on-the-Lake, the Regional Municipality has moved ahead on phasing out the outdated water treatment plant by constructing a pipeline connecting Niagara-on-the-Lake with the St. Catharines De Cew Falls water supply.

The Province is considering participating, in 1982-83, in approximately 15 hearings in the U.S. concerning the renewal of State Pollution Discharge Elimination System (SPDES) permits. In addition, the Ministry will closely follow the progress of the three pending litigations brought by the State against waste disposal sites in the Niagara area.

Canadian Centre for Toxicology

A major weakness of environmental agencies around the world is the lack of information on the significance of the trace levels of contaminants now being detected.

To address this important imbalance the Province announced its intention in 1981 to support the establishment of a Centre for Toxicology, building on programs which are currently at the Universities of Toronto and Guelph. The Ministry of the Environment has been designated the lead Ministry for Provincial involvement with the Centre.

The programs and policies of the Centre are being developed and feasibility studies are underway. The proposed programs of the Centre will include analytic and testing services, cellular and molecular toxicology, epidemiology, environmental and food chain dynamics and professional training.

The Centre is intended to be a consortium involving all levels of Government, industry and the university community and is seeking financial support from several sources. As a consortium, it will build upon the strengths of these supporters, and apply its resources to the diversity of needs that its supporters present.

The universities concerned are already providing staff and facilities and industry has indicated it is willing to participate.

These highlights and other Ministry activities and achievements are reported in more detail in the following sections, which are set out according to Division and Region.

deputy minister

Deputy Minister — Gérard J. M. Raymond
Executive Assistant — R. G. Clark

Program Planning and Evaluation Branch

Director: A. Castel

The role of the Program Planning and Evaluation Branch is to identify the broad program and resource needs of the Ministry and to co-ordinate the effective management and efficient utilization of Ministry resources. There are three main areas of responsibility.

First, the Branch analyzes Ministry policies and programs, co-ordinates policy development and provides liaison with the government's central agencies including the co-ordination of policy submissions. In 1981-82, the responsibility for analyzing policies and co-ordinating policy development gained recognition and support. The Branch distributed seven new policies including, for example, a policy on Environment Ontario's Pollution Abatement Program for the Pulp and Paper Industry. Also, the Branch submitted several notable submissions to the Cabinet Committee on Resources Development regarding the Grand River Basin Water Management Study, and regarding Amendments to the Environmental Protection Act.

Second, the Branch develops and maintains Ministry strategic and operational planning systems. In 1981-82, approval was obtained for the strategic planning process and implementation is planned for 1982-83. Also in 1981-82, the Branch enhanced the Ministry's MBR (Management-By-Results) system so that better information is available to support more consistent application to management needs. The special studies completed in 1981-82 focussed upon the Ministry's role in the operations and management of water and sewage works.

Third, the Branch provides socio-economic analysis of environmental concerns and of the impact of economic activities on the environment.

The Branch provided the Co-ordinator for the Canada/Ontario Task Force on Inco and Falconbridge whose task it was to guide Task Force studies of emission control options for the smelters and of the socio-economic impact of controls.

In addition, the Branch concluded several studies of the economic impact of environmental activities, for example, a study of the economic impact of rehabilitation of the English Wabigoon River System, and a study of the economic incentives for industrial waste management.

The Branch also produced several studies in support of the U.S.-Canada Memorandum of Intent

on Transboundary Air Pollution; specifically sections dealing with Economic Benefits, Methods and Inventory of Resources at Risk, and Emissions and Control Options.

The Branch also supported the Ministry's interventions into various U.S. regulatory proceedings by providing economic analysis in conjunction with the submission to the U.S. Environmental Protection Agency on Interstate Pollution Abatement and the submission to the Michigan Air Pollution Control Commission on Detroit Edison's Monroe power plant. Also, increased emphasis has been placed on providing studies of the economics of internal administrative processes and providing advice to Senior Management on the financial and economic implications of abatement and enforcement activities.

Legal Services Branch

Director: J.N. Mulvaney, Q.C.

During the 1981-82 fiscal year, staff of the Legal Services Branch undertook 59 prosecutions. As of April 1, 1982, 32 of these resulted in convictions, one was withdrawn and 25 were still before the courts. The largest fine obtained for a prosecution initiated in the fiscal year was \$8,500 against Kimberley-Clark of Canada Ltd.

The Branch was involved in Ontario's submissions to the U.S. Environmental Protection Agency with respect to acid precipitation and to the State of New York regarding poorly-treated sewage flowing into the Niagara River from the City of Niagara Falls.

Staff also drafted the Consolidated Hearings Act, 1981, which is designed to reduce the multiplicity of hearings required under certain statutes and were involved in two hearings under this Act.

environmental assessment and planning division

Assistant Deputy Minister — J. W. Giles
Executive Director — W. B. Drowley

This Division has three major responsibilities which provide a scientific base for many of the Ministry's policies and activities:

To serve as the central approval and co-ordinating agency for applications involving the design, construction and operation of water, sewage, solid waste reclamation and recycling plants and waste disposal sites required under Ontario legislation.

To conduct scientific and technical research, assessment and pollution control programs involving the use of water, land and air resources, the environmental implications of realty development and the control of all forms of pollutants.

And, to provide technical and supervisory services required in the planning, construction and operation of water and sewage treatment plants, solid waste and resource recovery facilities.

Air Resources Branch

Director: G. Van Volkenburgh

Air Quality and Meteorology

The Section maintains the data base and telemetering system of Ontario's air quality monitoring network, which in 1981-82 constituted approximately 1250 instruments located in 125 areas.

This network produced approximately 3 million measurements, which are computer processed. The measurements consist of the levels of 12 contaminants or classes thereof, as well as meteorological parameters.

The Section also develops and applies mathematical models to compute the quality of air and dry and wet deposition (acidic precipitation) of contaminants.

The Ontario Air Pollution Index, the basis for the Ontario Alert System, continued to be monitored and publicized daily for Windsor, Sarnia, Hamilton, Niagara Falls, Toronto, Sudbury, Coniston, New Sudbury and St. Catharines. (See page 58.)

Atmospheric Research and Special Programs

The Monitoring and Instrumentation Development Unit monitors air quality in special locations using mobile facilities. It also develops and evaluates new instrumentation to measure concentrations of non-routine air pollutants.

In 1982, Staff were deeply involved in monitoring the CP derailment in Medonte Township. By using the Mobile Air Monitoring Unit (MAMU) and the Trace Atmospheric Gas Analyzer (TAGA 3000) vehicle, they were able to provide advice on potential air quality deterioration.

The Special Studies Unit is responsible for the co-ordination of activities under the Nanticoke Environmental Management Program (NEMP) and for carrying out the atmospheric chemistry and deposition (wet and dry) program for the Acidic Precipitation in Ontario Study.

The Atmospheric Contaminants and Research Planning Unit was involved in developing convenient methods of field sampling for organic vapours and in emergency response planning. They are also conducting a comparison study of methods for sampling inhalable particulate matter.

In addition, the Section was responsible for 17 research projects sponsored through the research grants program for a cost of \$274,000. The money was received by researchers in Ontario Universities.

Extensive Air Monitoring Surveys in 1981-82*		
Compounds	Location	Source
Toxic Chemicals	Hamilton	Upper Ottawa Street Landfill Site
Hydrocarbons and Amines	Sarnia	Tricil Ltd.
Amines	Sarnia	Chinook Chemical
Range of Organic Compounds	Elmira	Uniroyal Ltd.
Hydrocarbons, Sulphur Dioxide, Reduced Sulphur Compounds	Breslau	Breslube Enterprises
Hydrocarbons	Hamilton	Diamond Shamrock Ltd.
Hydrocarbons	Toronto	T.T.C. Yards
Reduced Sulphur Compounds	Nanticoke	Texaco-Stelco
Particulates, Hydrocarbons, Nitrogen Oxides, Ozone, Sulphur Dioxide	Windsor	Transboundary Air Pollutants

**Further information on these surveys is available to the public upon request.*

Emission Technology and Regulation Development

During the fiscal year, the Regulation Development and Environmental Assessment Unit established four guidelines for new contaminants and issued comments on air quality in 25 environmental assessments. Staff made recommendations in the revision of O. Reg. 308, assisted in the development of Ontario Hydro Regulation (O. Reg. 7/82) limiting the emission of sulphur dioxide and nitrogen oxides, and was the lead group in the establishment of a new regulation (O. Reg. 151/81) for the control of sulphur dioxide in Sarnia.

The Control and Process Technology Unit undertook intensive review of the electrical power and

major non-ferrous smelting and refining operations in Ontario, particularly with reference to reducing acid precipitation. In addition, staff evaluated special studies and other information on emission control technology to assist the Long Range Transport of Air Pollutants Abatement and Strategy Committee. Staff also participated in an inter-Ministry health study on fluorides and in the evaluation of PCB destruction systems.

In 1981-82, the Source Measurement Unit, in co-operation with the Ministry's pesticide laboratory, developed specialized methods for testing dioxins and other hazardous chlorinated compounds from thermal incineration. Staff also worked with industries to introduce new equipment for the continuous monitoring of air pollution sources; wrote reports on emissions in Sudbury and Nanticoke; and, helped design and execute source testing in a number of specific industries.

Phytotoxicology

The Section conducted soil and vegetation assessment studies near 71 industrial and other sources in Ontario and investigated 221 vegetation complaints from the public.

During the 1981 crop-growing season, Staff conducted extensive field assessment surveys to determine the degree of photochemical oxidant (ozone and/or peroxyacetyl nitrate), injury on white bean, tomato and potato crops. Oxidant injury to crops was more severe in 1981 than in 1980.

Several field investigations continued in the vicinity of industries emitting atmospheric fluorides, particularly near the St. Regis Indian Reserve, Cornwall Island. The purpose of the studies is to define the current area of contamination resulting from fluoride emissions from Reynolds Metals Company and the Aluminum Company of America, Massena, New York.

In 1981, the Ministry officially opened its new greenhouse facility, in Brampton. This is the largest controlled growth environmental facility in Canada will enable scientists to carry out long term studies on possible synergistic damage to vegetation due to the simultaneous effects of various pollutants.

Vehicle Emissions

During 1981-82, 4,519 cars in 20 locations throughout Ontario were spot-checked for emission controls and exhaust pollutant levels. Of these, 2,15 (48 per cent) exceeded Ontario emission standards and their operators were requested to have the problem corrected. Approximately 357 cars (eight per cent) had pollution control equipment disconnected or inoperative and were issued violation notices.

In total 2,673 cars were inspected at 280 used-car dealerships and 80 violation notices were issued. During spot-checking of muffler shops and gas stations, 221 muffler shops were visited to ensure proper replacements for catalytic mufflers and 201 gas stations were checked to ensure that leaded gasoline is not dispensed to catalyst-equipped vehicles. Highway patrols, in co-operation with OPP personnel, resulted in 473 diesel trucks being stopped for excessive smoke emissions. Subsequently 55 warnings and 418 charges were issued; 358 operators were found guilty and fined, with the remaining cases still pending.

Staff made 31 visits to community colleges to explain the provisions of the Environmental Protection Act and the Ministry control program to 2,673 student mechanics.

Water Resources Branch

Director: D.N. Jeffs

The Ministry of the Environment carried out a minor re-organization in 1981 and transferred three units to the Water Resources Branch. With the addition of the Industrial Organics and Inorganics Units, the Branch strengthened its ability to monitor hazardous contaminants and to make recommendations on the control of industrial sources of water pollution.

The transfer of the Ground Water Development Unit added to the Branch's hydrogeologic research capabilities and its protection of groundwater quality.

Water Management

The implementation of water management policies continued under the direction of the Water Management Steering Committee and its five working groups. Compatibility among policies and guidelines of various ministries was advanced through the formation of an Interministerial Water Management Committee. Examples of interagency liaison activities include MOE-MNR roles on fisheries and water resources management, strategic planning for Ontario fisheries, aquatic plant harvesting guidelines, recreational water quality, underground storage of petroleum products, urban drainage policy, erosion and sedimentation. Numerous reports on technical procedures were published. Branch staff also participated

in federal-provincial and international committees working on a wide range of water management programs.

The Branch provided technical input to the Maple Landfill Committee through liaison with the proponent's consultant on an adequate response to the Environmental Appeal Board's conditions for the site. The Branch also worked with the Ministry of Transportation and Communications/Ministry of the Environment Salt Contamination Committee.

By year-end, Staff had issued 451 drilling and boring contractors licences and licenced 11 new contractors. Prosecutions against two drillers on four charges were successful; renewal of one licence was refused and two other prosecutions were awaiting trial. Approximately 8,930 water-well records were received for processing.

The Branch co-sponsored a one-day water-well drilling conference on well completion techniques to emphasize proper well completion, the use of pitless adaptors to connect plumbing systems to wells, and the Ontario Hydro requirements on connecting submersible electrical pumps to electrical systems.

Amendments to Sections 21 and 22 of the Ontario Water Resources Act, dealing with construction of water wells, received Third Reading and Royal Assent late in 1981; revised regulations prepared under the amendments will be introduced in 1982.

Observation wells were established to monitor municipal water-supply aquifers at Barrie and Newmarket-Aurora. Observation wells near the City of Guelph were re-instrumented for improved data acquisition on the local aquifers used for water supply.

Staff have also undertaken a study to determine the potential of wetlands for year round sewage treatment. Phase I of the marshlands project at Listowel was completed in 1981. This experimental facility is now operational and preliminary information on treatment technologies is available. The results are being applied to other areas.

Sport Fish

Again during 1981-82, Ministry Staff co-ordinated the co-operative Ministry of Natural Resources/Ministry of the Environment program of collecting sport fish from throughout Ontario and testing them for a variety of trace contaminants such as mercury, PCB, mirex, and DDT. For the first time, results were provided on tests for dioxin.

During the year, the Ministry issued six environmental health bulletins containing new or updated information on contaminants in fish.

Grand River Study

Activities related to the Grand River Basin Water Management Study centred around the completion of the final report, its appendices and supporting technical reports.

Stratford-Avon River Environmental Management Project

In this two-year study, information was assembled on water quality, aquatic plants and algae, hydrology and pollutant loadings from sewage treatment plants, industrial discharges and agricultural areas. Demonstration projects of remedial measures were initiated in-stream and in the urban and rural areas.

Lake Simcoe Environmental Management Strategy Study

This study is being conducted by the Ministry and the South Lake Simcoe Conservation Authority. The goal of the project is to restore the water quality of Lake Simcoe to a level that will support a cold water fishery, with the specific objective of reducing algal growth in the lake by controlling phosphorus loadings.

In the first year of this three-year study, technical studies were initiated on monitoring the flow and quality of streams entering Lake Simcoe; the collection of agricultural land use data; and, monitoring the quality of Lake Simcoe.

Toronto Area Watershed Management Strategy Study

Activities relating to the Toronto Area Watershed Management Strategy Study began in 1981. The Ministry is conducting the project in co-operation with the Metropolitan Toronto and Region Conservation Authority, the City of Toronto and the Boroughs of Metropolitan Toronto. During the first year of the project, staff compiled existing sources of data on water quality and pollution control systems and collected additional data needed to fill major gaps in the data base.

Industrial Wastewater

As part of the program to control industrial pollution, information on abatement strategies and wastewater data for Ontario industries were provided to the International Joint Commission (IJC). The Ministry was represented on the IJC Point Source Pulp and Paper Task Force and several industrial status reports and guidelines were prepared.

The Toxicity Unit conducted surveys in Cornwall to assess the potential impact of discharges from Courtauldes Industry on the St. Lawrence River; in Hawkesbury at the Canadian International Paper's

(CIP) mill; and, in Elliot Lake to assess the impact of tailings on the Serpent River.

Contaminant surveys were carried out in the Humber and Don Rivers, in the Niagara River, and at other locations on the Great Lakes using young-of-the-year minnows. Staff worked jointly with Environment Canada on a pulp and paper survey in the Northwestern Region.

Water Resources Inventories

Results from a water resources inventory study of the basins of the Holland and Black Rivers were assembled for publication, field work was completed in the Humber and Don Rivers, and planning was commenced for the Credit River study.

Water resources data (1980) for streamflow, water quality and observation well monitoring networks were released in three publications: Water Resources Bulletin 3-15, Surface Water Series; Volume XVI, Water Quality Data Series; and, Water Resources Bulletin 2-107, Ground Water Series.

Water well information obtained from licensed drilling and boring contractors was released in two publications in the Ground Water Series: Water Resources Bulletin 2-27, County of Simcoe, 1946-1977, and, Water Resources Bulletin 2-28, Regional Municipality of Niagara, 1946-1979.

In addition, the ground-water mapping program continued and a ground-water probability map for the County of Simcoe (Southern Portion) was released.

Engineering, Scientific and Data Services

Geophysical surveys involving seismic, resistivity, gravity, well logging and magnetometer techniques were undertaken to assist in the investigation of ground-water contamination problems, ground-water development projects, hydrogeological investigations for waste disposal sites, geological mapping for construction materials, well construction and the location of buried metal containers containing hazardous materials.

Ground-water surveys and general reviews of ground-water potential were undertaken for eight municipalities, and seven test drilling and well construction projects to develop municipal water supplies were supervised.

Water resources data were supplied on request by consultants, educational institutions, other government agencies and the public interested in the Province's water resources.

Technical input and guidance was provided to the Niagara Escarpment Commission at three sector hearings on the significance of ground water in various land development proposals along the Niagara Escarpment.

Technical assistance was also provided to the Environmental Hearing Board regarding the extension of the York Sanitation landfill at Whitchurch-Stouffville.

Inland Lakes

Staff completed the writing and review of a major report on the limnological portion of the Sudbury Environmental Study. The Study involved intensive monitoring of seven lakes in the Sudbury area. The acidic control lake, Clearwater Lake, was monitored for seven years. This represents the world's longest continuous monitoring program of an acidic lake.

Acidic Precipitation in Ontario Study

Staff were deeply involved in the Acidic Precipitation in Ontario Study (APIOS). They continued intensive sampling and analysis of the eight major study lakes near Dorset and their 31 associated watersheds.

The Branch completed Phases I and II of the impact assessment investigations, under the Canada-U.S. Memorandum of Intent on long range transportation of air pollution, regarding the impact of acid rain on the aquatic environment. The results were published jointly by Canada and the U.S. They indicated that sulphur dioxide and sulphate are prime contributors to the acidification of watersheds and sensitive lakes and that increased loadings during the snow melt period damage aquatic life. Phase II of the report identified target loadings of sulphate required to protect all but the most sensitive lakes. Information from the Ministry's watershed studies and its extensive lake monitoring program provided valuable facts for the aquatic impact reports.

Staff also participated in interventions, public information symposiums, congressional tours and hearings related to acid rain.

At the request of the Swedish and U.S. governments, Staff took part in the evaluation of research and investigative programs in both of these countries.

Booth Aquatic Research Group Inc. was awarded a contract to begin a new experimental lake neutralization study in Sudbury and the Muskoka/Haliburton areas. The study is designed to determine the possibility of restoring sport fishery to acidified lakes and of protecting valuable fish stocks in sensitive lakes, endangered by acidic precipitation.

Investigations of the effects on fish of metals released to streams and lakes by acid precipitation, snowmelt and storm runoff were initiated in the laboratory and at the Dorset field site.

Great Lakes Program

The Great Lakes program is a federal/provincial cost-shared surveillance, investigation and assessment program providing the data and information required for defining existing environmental conditions and trends in the nearshore areas and connecting channels of the Great Lakes, and determining cost-effective pollution abatement and prevention measures necessary to restore and maintain water quality in accordance with Provincial objectives and the objectives of the Canada-U.S. Agreement of 1978.

Ministry surveillance programs along with the programs of other environmental and regulatory agencies around the Great Lakes are rapidly adding to our knowledge of the distribution of many compounds such as mercury, PCBs and DDT as well as of many new contaminants. Controls on the manufacture, transport, use or emission of the contaminants of most immediate concern have been implemented across the basin.

The following are the highlights of the Ministry's surveillance activities on a lake-by-lake basis. More detailed findings are reported in the 1981 Great Lakes Water Quality Board Report to the International Joint Commission and the Ministry's Great Lakes Water Resources reports.

Lake Superior

In preparation for the 1983-84 Lake Superior intensive surveillance year, a detailed investigation was conducted in Jackfish Bay to assess the effects of a pulp and paper mill discharge on water quality and biota. Findings of this assessment were provided to the Pulp and Paper Point Sources Task Force for use in its 1981 Report to the Great Lakes Water Quality Board. The Report concluded that the pulp and paper industry has made substantial progress in meeting effluent limitations and must continue its pollution abatement programs in a timely fashion to meet the requirements of the Canada-United States Agreement.

Lake Huron

As part of the 1980-81 Lake Huron intensive surveillance year studies, reports on the water quality conditions at Owen Sound, Wiarton and Collingwood

were completed. Enrichment of Collingwood Harbour, causing nuisance algal growth, is being addressed through the upgrading of the municipal sewage treatment facility.

Monitoring of the impact of construction activities and flow alterations at Great Lakes Power on the St. Marys River showed no adverse effects on local water use. Elevated phenolic and bacterial levels however continue to exist along the Sault Ste. Marie waterfront and have locally restricted recreational use.

Surveillance of the effects of reduced phosphorus loadings continued in the Penetang-Midland area. Limited exchange of the waters of Georgian Bay and the waters in embayment areas receiving treated municipal effluents are slowing the response to phosphorus control.

Lake Erie

Lakes Erie and St. Clair, combined with the St. Clair and Detroit Rivers, drain one of the most developed urban areas on the Great Lakes. Because of the high potential of man's impact on water quality in this area, annual surveillance programs are maintained to closely monitor and detect resulting environmental problems.

Based on the 1978-1979 intensive surveillance year studies, the Ministry and Ohio State University prepared a joint report on the western basin of Lake Erie. Nutrient levels showed a gradual decline from the western basin towards the central basin; levels along the Ontario shoreline remained low and relatively uniform.

Monitoring continued in the St. Clair River for phenolic compounds and public health indicators; at Nanticoke for effects of industrial development; and, along the Ontario shoreline of the Detroit River for the response to municipal abatement measures. Improvements in controls on the discharge of trace organic chemicals are being pursued to ensure continued protection for water supplies and fish. The environmental quality of the Detroit River and the western basin of Lake Erie has improved considerably over the last decade, as a result of better treatment of municipal and industrial point source discharges.

Lake Ontario

As part of the Great Lakes International Surveillance Plan (GLISP) intensive year studies, regular nearshore Lake Ontario monitoring was enhanced to include an intensive water quality spring cruise; weekly phytoplankton/nutrient monitoring at three

locations corresponding with three separate water quality regions; a comprehensive benthic invertebrate survey; an investigation into oxygen depletion status in the eastern basin off Prince Edward County; and, a bacteriological survey of the Bay of Quinte.

In addition, investigations continued with special emphasis on the Niagara River and the Toronto waterfront. In the Niagara River, efforts were focused on the continued identification of sources, monitoring of water and sediment quality and the biomagnification of persistent toxic substances. Results were reported and discussed in the Canada-Ontario Review Board's publication, entitled "Environmental Baseline Report of the Niagara River, November 1981 Update". Results of surveillance effects indicate that the Niagara River is a continuous source of numerous trace metals and organic compounds to Lake Ontario. High priority efforts were continued to identify sources of pollutants, recommend necessary control programs for both Canadian and U.S. sources, and develop long-range water quality monitoring programs.

Intensive investigations of the Toronto waterfront conducted in 1980 led to the publication of two Ministry reports on the effects of dredging, of dredged soil disposal and of lakefilling activities on the water quality in the area. 1981 surveillance concentrated on measuring response to waterfront remedial activity and ongoing development. Water supplies and public beaches were generally unaffected by the waterfront activities.

Basin Wide Studies and Support Activities

Ongoing basin wide programs to support the Great Lakes surveillance were radioactivity monitoring, tributary monitoring, surveillance of contaminants in young-of-the-year fish, Great Lakes municipal intake monitoring, monitoring of the outlets at Lake Superior, Lake Huron and Lake Erie and interlake mass balance studies.

In 1981, 139,378 sample analyses were carried out at the Toronto and regional laboratories in support of the Great Lakes surveillance program and reportings were made to IJC, COA Review Board, government departments and the public.

Pollution Control Branch

Director: K. E. Symons

Municipal and Private

During the 1981-82 fiscal year, data on the fluoridation of drinking water in Ontario was compiled and mailed to the municipalities which add fluoride, the Medical Officers of Health and field staff. This data is used by the Directors of Dental Services of the Health Units and others engaged in dental health programs.

In July of 1981, the consultative and advisory functions related to private water supplies were transferred from the Ministry of Health to Environment Ontario. Since the Ministry assumed this responsibility, staff have assisted two local public health agencies in organizing surveys of contaminated bathing beaches in their areas. Advice was also provided to local public health agencies on private water supply problems and corrective measures were recommended on water quality problems arising from 81 private wells.

Guidelines on house water treatment devices were finalized and published and were distributed to the Ministry's Regional Offices and local public health agencies. Staff conducted seminars on private water in two health unit areas and completed, for the Ministry of Health, guidelines for the inspection of environmental conditions in schools.

Negotiations were completed with the federal authorities to provide grants of \$65 million over a three year period, starting in April 1982, to assist in the construction of municipal sewerage systems in the Great Lakes Basin under the terms of the Canada-Ontario Agreement on Great Lakes Water Quality. During 1981-82, federal funding of municipal water and sewage projects came to an end.

An intensive effort was initiated to systematically review and update all policies and guidelines in the municipal sewerage area. Twelve reviews were completed and 14 others initiated.

Monitoring and evaluation of the phosphorus removal program continued. In 1981, 245 wastewater treatment plants with phosphorus removal facilities removed an estimated 7,500 tonnes of phosphorus which would otherwise have been discharged to Ontario's lakes and rivers.

Implementation of the Guidelines for Utilization of Sewage Sludge on Agricultural Lands successfully moved into the third year of its phase-in period. Municipalities are now spreading sludges under Ministry guidance. Corrective measures, brought into effect by municipalities, will ensure maximum agricultural utilization of sludges with minimum risk to health, the environment and crop production.

Development of Phase I of the Total Utility Monitoring and Management Information System (TUMMIS) was completed. The System stores perfor-

mance data for water and wastewater treatment facilities across the Province, and is now capable of automatically assessing compliance with specified performance criteria. Input of data has begun. TUMMIS assists in monitoring the progress of remedial action for plants out of compliance and forecasting needs of operational or plant changes.

Four notices were prepared and distributed to those responsible for administering and delivering the Private Sewage Program to keep them informed on technical, financial and legal aspects governing private sewage systems.

The products of 41 septic tank manufacturers were accepted for use in the Province, following a review of reports submitted by consulting engineers on their behalf.

As a result of substantial revisions to the regulations on Private Sewage Systems made under Part VII of the Environmental Protection Act, O. Reg. 374/81 was filed and issued to all those delivering the private sewage program. Staff conducted 13 seminars throughout the Province to introduce and discuss the Regulation. Some 600 persons from the Ministry, Health Units and consultants attended.

Noise Pollution Control

Staff provided expert testimony or consulting services in three legal actions and at four Ontario Municipal Board Hearings. One hundred and fifty noise complaint procedures were processed and 28 noise vibration complaint investigations were carried out. In addition, 28 environmental assessments and 85 applications for Certificates of Approval were reviewed for comment and 502 new land uses were reviewed for potential impacts.

Seventy-nine municipalities have now adopted a noise control bylaw under Section 138 of the Environmental Protection Act. Seventy-one of these bylaws and six others in process prohibit prescribed noise-making activities by time of day and place in the community. Three comprehensive bylaws and four animal noise specific bylaws were also approved and adopted.

Staff participated in the development or review of 20 Ministry and inter-agency policy statements on noise. The technical publications directly supporting the Model Municipal Noise Control Bylaw and the implementation of noise control bylaws have been revised in preparation for publication as Volume 2 of the Model Bylaw.

Eight seminars and workshops for 150 participants were given to municipal, regional municipal, and provincial government staffs. In addition, 44 participants received intensive technical training in co-operation with the Canadian Acoustical Association and the Ministry of Labour.

Consultants were retained to study and report on the effects of train noise reflections from barrier walls in the Town of Vaughan.

Pesticides Control

During 1981-82, the Section held 2,051 examinations and issued licences to 6,891 exterminators, 1,033 operators, and 3,717 vendors. In addition, Staff issued 193 permits for the use of restricted products on land, 412 permits for the application of pesticides to water, and 191 permits for structural extermination.

The Ministry approved grants for chemical treatments and structural alterations to control termites for 478 householders in 18 municipalities. The total amount of these grants was \$365,000.

Contingency Planning

The Ministry is responsible for the development and maintenance of the "Province of Ontario Contingency Plan for Spills of Oil and Other Hazardous Materials" by organizing the activities of the various government agencies, which may be involved in a major spill. The Plan and its supplement, "Commercially Available Oil Spill Containment and Clean-up Equipment" were updated and reprinted during the fiscal year.

Environment Ontario encourages and helps municipalities and industries to prepare their own contingency plans. Staff were involved in the testing of six contingency plans through field exercises.

During 1981-82, the Contingency Planning Section received spill reports on 568 incidents. An indepth summary of these spills was prepared. In addition, staff supplied spill data retroactive to 1974 to Environment Canada for use in their national review of all spills in the environment. This data will now be supplied yearly.

Research and Development

During the 1981/82 fiscal year, the Ministry funded 195 environmental research projects. Fifty per cent of these projects were carried out internally, 18 per cent by industry, 30 per cent by educational institutions, and two per cent by external research organizations. Staff administered 17 health-related environmental projects funded by Provincial Lottery Funds. The expenditures in 1981/82 were \$1.8 million.

Technology transfer was continued through publication of research papers and seminars.

Applied Sciences

This Section is an engineering group which carries out and reports on studies of innovative concepts

relating primarily to municipal servicing for Northern communities and alternative private waste systems for non-sewered development.

During 1981-82, staff prepared two reports on the basis of private waste disposal studies and provided technical information for O. Reg. 374/81, concerning private sewage systems.

In addition, staff provided technical advice and field service related to the design, approval and construction of five large subsurface sewage disposal systems for commercial establishments and resorts.

Technical advice was also given to both the public and private sectors on the design and construction of pipelines, including the inspection of five major failures.

Wastewater Treatment

During the 1981-82 fiscal year, the Section was involved in 16 research projects concerning the treatment of municipal wastewaters. Projects included high level phosphorus removal, the application of ultra-violet disinfection technology, and the characterization and fate of organic contaminants in biological wastewater treatment.

Staff participated in four watershed management studies, providing input concerning municipal effluent discharges.

Assistance was provided to 25 municipalities on various aspects of wastewater treatment and to 12 industries concerning their specific waste treatment problems. In addition, Staff reviewed 17 applications for sewage treatment works in conjunction with other Sections of the Ministry.

Various research projects were carried out at the Ontario Experimental Facility in Brampton, including the performance testing of three new aeration devices in conjunction with their manufacturers.

Water Technology

Environment Ontario continued its research into trace organics, contaminants in water treatment chemicals, iron and manganese treatment, asbestos, the effect of treatment processes on treated water quality, distribution systems, and into macro/microbiological water quality.

A technical advisory service is provided to municipalities and engineering consultants on new water supply treatability studies, new water plant commissioning, plant up-rating and plant operation and technical problems, including the advanced treatment necessary for trace contaminant control or removal.

Environmental Approvals Branch

Director: T.W. Cross*

Industrial Approvals

The Section receives and processes industrial applications for the approval and control of facilities for contaminant discharges into the natural environment. The following chart summarizes this activity for the 1981-82 fiscal year.

Applications Processed From April 1, 1981 - March 31, 1982				
	Received	Approved	Cancelled	Denied
Air	1,051	1,032	92	1
Water	143	113	27	1
Waste	0	0	0	0
Total*	1,194	1,145	119	2

**Includes "applications received" and "processed" by Technical Support Group, Central Region.*

Staff held a number of meetings with Tricil Ltd. on a proposal by the company to replace the incinerator portion of their Corunna plant and to increase its capacity by 20 per cent. This plant is the only commercial liquid industrial waste incinerator in Ontario. The proposal was approved with the condition that cyanides, chlorinated hydrocarbons, PCBs and radioactive wastes be excluded from the site.

Since the 1979 acquisition of Reed Paper Company in Dryden, Ontario by the Great Lakes Paper Company, a total of \$40 million has been budgeted for pollution control. Approximately 50 per cent of this has now been allocated. During the 1981-82 fiscal year, two Certificates of Approval were issued for the control of both air and wastewater emissions including an extended aeration lagoon and a black liquid recovery boiler. A tall oil recovery unit was also constructed to eliminate emissions of turpentine in the atmosphere.

Municipal and Private Approvals

In 1981-82, the Water and Wastewater Approvals Unit processed 834 water works applications at an approximate cost of \$128 million and 1,248 sewage works applications at an approximate cost of \$380 million.

The processing of these applications was greatly assisted by the Ministry's transfer program for technical review. Under this program, municipal engineering staff review routine water and wastewater applications against Environment Ontario's Guidelines and make recommendations to the Director of the Branch. Fourteen municipalities are now involved in the program.

The Waste Management Approvals Unit processed approximately 115 applications for waste management sites and 720 applications for waste management systems. Of these, 500 were re-issues.

Staff were also involved in an inventory program to ensure that active waste management sites are not serving a population higher than that which the Ministry originally licensed them to serve.

Environmental Assessment

The Environmental Assessment Act is considered by many jurisdictions around the world to be an outstanding piece of legislation.

In 1981, representatives from the Scottish Development Department, the Mexican Federal Government and the Netherlands visited the Ministry to learn more about the Act. In addition, at the request of the World Health Organization, staff advised the Polish Government on the establishment of an EA type process for major industrial, utility and resource projects.

Since the Act has come into force, Environment Ontario has received 80 Environmental Assessments (EAs) for both individual projects and classes of projects. Forty-two of these were approved or approved with conditions, four projects were referred to the Environmental Assessment Board for hearings under the Act and two projects for hearing under the Consolidated Hearings Act.

Staff worked with municipal representatives to develop Class EAs for road projects, water and sewage projects, urban transit problems and non-profit housing. The interim exemption covering these projects expires December 31, 1982.

A two-day seminar was also held for municipalities to provide additional training in environmental assessment.

A proposed terms of reference for an EA Advisory Committee to advise the Premier on exemption requests before Cabinet decisions and on EA matters in general was prepared.

During the year, staff completed the Government's Final Response to the Recommendations of the Environmental Assessment Board's Report on the Elliot Lake Inquiry.

EA Update, an information digest for professionals interested in EA matters, was published four times during the year.

**T.W. Cross retired in June, 1982 after 16 years of service with the Ontario Government.*

Land Use Co-ordination

During the 1981-82 fiscal year, the Section provided the Regions with the following support for municipal plan reviews:

- Prepared and issued five new chapters for a Land Use Plan Review Handbook;
- Conducted a two-day seminar on land use planning;
- Undertook preliminary work on the development of policy statements to be issued under the new Planning Act; and,
- Developed a pilot system for monitoring the municipal plan review program.

In July of 1981, Staff also began to co-ordinate the Ministry's review of EAs. This involves arranging pre-submission consultation as well as the review of formal submissions. Twenty-two draft EAs and nine formal submissions were reviewed.

Project Co-ordination Branch

Director: J.C.F. Macdonald

During 1981-82, the Project Co-ordination Branch handled 149 construction contracts and administered a capital expenditure of approximately \$99.5 million. Of this amount, 33.0 per cent was paid out as subsidies under the Ministry's construction program for municipalities. In addition, the Branch is responsible for the administration and budgeting of the Ministry's:

- Direct grant program for providing grants to assist the construction of municipally-owned water and sewage facilities (1981-82 expenditure \$52.5 million); and,
- The grant program for repair and renewal of private sewage and water systems in small communities (1981-82 expenditure \$4.4 million).

Project Management

During the fiscal year, the Section completed its administration of the funds provided by the federal

government's Community Services Contribution Program (CSCP). In 1981-82 the CSCP grants totalled \$51.6 million.

In the West Central Region, construction continued on the Haldimand-Norfolk Provincial Area Water Supply System and additional work was done on the trunk watermain to Hagersville and Jarvis.

In the Central Region, design and construction continued on the \$40 million sewage works and water works program for the community of Keswick in the Township of Georgina. Work on the first seven contracts previously awarded and valued at approximately \$9.5 million was virtually completed during the year. Contracts for the water treatment plant and the water intake valued at \$3.89 million were commenced. The tender call for the sewage treatment plant was delayed due to the difficulties in completing property acquisitions.

Construction was almost completed on the \$16 million Wasaga Beach sewage works and water works program with funding provided by the Ministry of Natural Resources.

Construction continued on the sludge processing works at the Lakeside sewage treatment plant of the South Peel Sewage System. Expenditures for the year were \$13 million.

In view of the structural deterioration of a number of concrete elevated water storage tanks, the Ministry appointed a structural engineering consultant to investigate and report on the problems. An interim report was completed in February, 1982 identifying about 20 Ministry tanks requiring rectification work. Repair work on the concrete elevated tank at Amherstberg was completed in October, 1981.

Northern Projects

Projects in Northern Ontario continued to receive financial assistance from the Ministry of Northern Affairs to accelerate infrastructure development. Approximately \$3.0 million was provided by Northern Affairs for direct administration by the Branch to assist 25 of these projects.

Two subsidy agreements under the General Development Agreement of the DREE/RPB (Department of Regional Economic Expansion/Regional Priority Budget) program continued to be administered by management committees, which include representatives from DREE, the Ministry of Northern Affairs, the Ministry of Intergovernmental Affairs and the Branch's Project Manager for the particular Region.

The Northwestern Management Committee administers a \$50.8 million program that includes sewage improvements in Thunder Bay and Ignace. The Northeastern Management Committee administers a \$30.0 million program that includes services for industrial parks in Parry Sound, Sudbury and North Bay, as well as infrastructure in Timmins. The

DREE/RPB program also included expenditures for infrastructure projects for single industry resource-communities such as Nakina, Longlac, Geraldton, White River and Hornepayne.

York-Durham Projects

In November 1981, three more existing sewage treatment plants were taken out of operation and flows were diverted from the Metro system. In addition, the incinerator facilities at Duffin Creek went into operation.

With the exception of a watermain to supply Woodbridge East and a short length of watermain in Richmond Hill, the basic York Water System was completed.

During the 1981-82 fiscal year, over \$23.1 million was spent on the York-Durham sewage system and approximately \$5.7 million on the York water system.

Design and Equipment Review

This Section reviews and evaluates for approval purposes, design submissions received from consulting engineers for all sewage and water projects where contracts are to be awarded or managed by the Ministry.

Staff processed approximately 108 submissions during the fiscal year.

Project Control

This Section monitors and records commitments and expenditures for direct grant projects and Provincial programs for sewage works and water works and advises on the scheduling of contracts to meet budgetary requirements. Various statistics on costs are compiled as required.

(See Tables 1 and 2 at the end of this section and Graphs 1 to IV in Appendices.)

Claims and Contracts

This Section handles disputed claims for payment made by contractors, third parties, etc. in rela-

tion to projects financed or managed by the Ministry and assists in arbitration or litigation arising from such claims. The Section investigates technical and contractual bases for claims and reviews matters with consulting engineers and expert witnesses.

The Section receives tenders, reports on tenderers' financial statements to senior management, carries out documentation related to the awarding of contracts and arranges for the execution of agreements.

Staff receive Notice of Claim under the Mechanics' Lien Act, maintain a Register of Claims, provide the basis for the Crown's defence in any mechanics' lien trial and assist in the resolution of lien claims whenever possible.

During 1981-82, nine disputes were in active litigation, three in reference to arbitration, and approximately 10 others were dealt with at an administrative level.

Special Activities

The Unit provides special inspection of construction, investigation of unusual construction problems, administration of the Ministry's prequalification system for concrete sewer pipe plants and a number of support functions for the Branch.

Approximately 100 field inspections of Ministry sewer and water works projects were carried out during the fiscal year and 30 man-days were spent on the investigation and resolution of special construction problems.

The Ministry and the Municipal Engineers' Association again sponsored the Construction Inspectors' Courses (Nos. 1 and 2). Approximately 60 representatives from municipalities and engineering companies attended the week-long courses.

Staff continued to review and draft standards and specifications and to evaluate new products proposed for incorporation into Ministry works.

Field Services

This Section is composed of specialists in mechanical and instrumentation equipment fields, who can advise on new and operational sewage and water works installations.

Staff also provide an emergency service as required and carry out maintenance audit inspections on operational plants.

During the fiscal year, roughly 62 per cent of staff time was spent on the capital works program and 38 per cent on operational installations.

TABLE I
PROJECT CO-ORDINATION BRANCH

Volume of activity under Capital Construction Program during 1981-82.

1. Capital Expenditure		\$99,501,000
Sewage Works		82,943,000
Water Works		16,558,000
Provincial Projects		98,031,000
Municipal Projects		1,470,000
Provincial Subsidy		32,854,000
% of total expenditure		33.02%
2. Construction – Ministry Projects		
Contracts Tendered	– No.	40
	Value	\$58,700,000
Contracts Started	– No.	43
	Value	66,204,000
Contracts Completed	– No.	85
	Value	91,357,000
Contracts Under Construction During the Year		149
Average Number of Contracts Under Construction in each month		67
3. Construction – Project Management (Direct Grant)		
Contracts Tendered	– No.	8
	Value	\$7,226,000
Contracts Started	– No.	9
	Value	7,760,000
Contracts Completed	– No.	15
	Value	9,651,000
Contracts Under Construction During the Year		19
Average Number of Contracts Under Construction in Each Month		5

TABLE II
PROJECT CO-ORDINATION BRANCH

Grants to municipalities for sewage works and water works during 1981-82.

1. MBR priority evaluations			
(1) Direct Grant Program requests	47		
Ruled eligible	27		
Rejected	20		
(2) Private Systems Program requests	33		Total
Ruled eligible	25		Evaluated
Rejected	8		80
2. Direct Grant Program payments (15% to 75% grants)		\$52,242,000	
3. Private Systems Grant Program payments (75% grants)		\$ 4,414,000	
4. Federal CSCP Grant commitments for payment in 1981-82 (administered by MOE)		\$51,600,000	

Waste Management Branch

Director: C. J. Macfarlane

Experimental Plant for Resource Recovery

The plant was in full operation throughout the year. There were no incidents of explosion during the year, likely the result of improved inspection of waste receipts and redirection of loads containing potentially hazardous materials to appropriate disposal facilities. The venting of the shredder proved effective in minimizing damage in the event of an explosion.

Browning-Ferris Industries were rehired as the contract operators for a further five years.

Marketing and Development

The Branch continued to develop markets for the products of the Experimental Plant during 1981-82.

Possible uses for the light fraction or refuse-derived fuel (RDF) from the plant continued to be investigated. A run of RDF was conducted at Canada Cement La Farge in Woodstock to test a new material handling system. Previous long term runs had successfully demonstrated the use of RDF in cement kilns in that there were no problems connected with either the cement or air quality. Testing will continue to improve the material handling aspects of RDF, an important factor in designing permanent RDF feed systems for cement kilns.

The Brampton Brick Co., with Ministry funding, completed the first stage of its investigation into the addition of mulched light fraction to brick as a burn-out fuel in clay brick manufacture.

A new mini-steel mill, Courtice Steel, investigated the use of the Experimental Plant's recovered ferrous in a densified form (baled) and found this material to be acceptable ferrous scrap.

Compost from the plant was both sold and provided for demonstration or evaluation to potential users.

Source Separation

Project Paper Recycling is in its third year of operation. Approximately 12,000 government employ-

ees in the Toronto area are involved in recovering fine office paper.

Project Paper Recycling had a gross revenue of \$23,000 for 1981 and removed 211 tons of paper from the solid waste stream.

Inquiries were received from over 500 universities, banks, private sector offices, and municipalities on setting up similar projects.

Source Separation Grant Program

An incentive program for source separation in municipalities and private companies was initiated in 1981. The Ministry provides 50 per cent of the cost of carrying out a feasibility study. If the study indicates a viable project, the Ministry will provide assistance for promotion and is prepared to make up any financial losses incurred during the early years.

Twelve companies and municipalities were involved in the program during the year.

Waste Management Studies

The Ministry offers a 50 per cent subsidy to municipalities to encourage them to undertake long term planning studies for waste management within their communities.

In the 1981-82 fiscal year, 10 studies were active, three were completed and seven studies initiated.

Waste Management Improvement Program

In 1981-82, 105 municipalities received subsidies to upgrade or close their waste disposal sites for a total cost of \$500,000.

Site Identification Study

Consultants were hired to carry out verification studies on 11 abandoned waste disposal sites, revealed through Ministry studies.

Staff initiated work on a plan for the perpetual care of disposal sites. This plan ensures that funds would be available, during the life of the site and into perpetuity, for any remedial action that may be required and to compensate for any damages.

Energy from Waste Studies

Environment Ontario and the Ministry of Energy are carrying out 12 projects across the Province using wastes to produce energy.

Disposal of Liquid Wastes

The Ontario Waste Management Corporation decided against the location of a major liquid waste disposal facility in South Cayuga. It is actively pursuing possible alternative sites.

The waybill system for monitoring the movement and disposal of liquid industrial wastes was expanded through the use of a new data processing system.

The following regulations were prepared during the 1981-82 fiscal year:

- A regulation to legalize the use of existing landfill sites for the disposal of some types of liquid industrial wastes, pending the completion of properly designed treatment facilities;
- A draft regulation to provide additional controls on generators, particularly with regard to solid chemical wastes not included in the existing waybill system; and,
- A regulation to establish safe standards for the handling and storage of PCBs.

PCB Handling and Storage

The Branch has provided funding to outside agencies working on techniques for the destruction of PCBs.

Radioactivity

Environment Ontario is working with the federal government on guidelines and criteria for the most effective means of disposing of low level radioactive wastes, many of which are produced as a residue of common industrial processes.

Hazardous Contaminants Office

Co-ordinator: C.E. Duncan

The Hazardous Contaminants Office was officially established in May, 1980 to develop and main-

tain a comprehensive and coherent program related to hazardous contaminants in the context of other environmentally related programs in Ontario; to provide liaison with federal, provincial and other agencies and committees; and, to co-ordinate all the research programs within the Ministry related to hazardous contaminants.

Two program co-ordinating committees were established: the Hazardous Contaminants Co-ordinators Committee (HCCC) and the Hazardous Contaminants Management Committee (HCMC).

The Co-ordinators group is composed of representatives from seven Branches and all the Regions. It is responsible for developing short and long range plans in relation to hazardous contaminants. The Management Committee, chaired by the Executive Director, is composed of Directors and reviews all matters raised by the Co-ordinators Committee, approves appropriate activity and recommends approval of required resource allocations.

During the 1981-82 fiscal year, the Office evaluated a number of chemical assessment schemes to develop a list of chemicals of concern. The Office has adopted the chemical assessment approach advocated by the State of Michigan as a preliminary environmental health effects assessment for these chemicals.

As part of the Office's information program, a Hazardous Contaminants Library has been developed. A bibliography on current acquisitions is circulated to the Branches and Regions and on-line capability to two computer data bases on toxic substances is available.

In addition, Environment Ontario and the Ministries of Health and Labour formed an Environmental Health Committee. A major accomplishment of this Committee was the development and implementation of a protocol for a request for medical assistance.

Acidic Precipitation In Ontario Study

Co-ordinator: E.W. Piche

The Acidic Precipitation in Ontario Study Office (APIOS) was established in 1979 to co-ordinate all of the Ministry's activities relating to acid precipitation.

During the 1981-82 fiscal year, Environment Ontario continued to operate the two networks of monitoring stations set up in 1980 to measure fallout and to identify sources of acid rain throughout the Province.

The two networks are complementary but yield different information. One is designed as a "true event" network sampling precipitation and particulate matter on a daily weather basis. The other is a "cumulative" network sampling precipitation and particulate matter on a monthly basis. Both are designed to collect wet and dry depositions. All samples collected are analyzed at the Ministry's Toronto laboratories.

In 1981, a report containing information on all of the lakes sampled in the Province was released. An update was issued in early 1982. The public now has access to acid precipitation data relating to 1,600 Ontario lakes. A more technical report was also sent to public libraries, universities and the Ministry's District Offices.

A calibrated watershed study continues in the Muskoka/Haliburton area to measure the amounts of acids and other materials entering and leaving lakes.

A terrestrial program was initiated to survey soils and vegetation to determine trends in acidification. Acid rain was simulated in a number of experiments to study its impact on soils and certain species of crops.

Socio-economic studies also continued throughout the year. The Amenity Value Survey was designed to determine the public's willingness to pay for environmental clean-up. Other studies dealt with the effects of acid precipitation on the tourist industry and the cost effects of acid rain in other areas, such as agriculture and forestry.

An Ontario/Canada Task force was established to identify and enumerate the environmental, economic and social consequences of alternative air pollution abatement options, which will assist in making policy decisions relevant to the Inco and Falconbridge smelting operations in the Sudbury area.

The Ministries of the Environment and Natural Resources announced a joint five year experimental study on the neutralization of acidified lakes. The actual neutralization of the lakes selected began in the summer of 1982.

In the spring of 1981, Environment Ontario filed a legal intervention with the U.S. Environmental Protection Agency (EPA) which asked the EPA to reject proposals from six states for a relaxation of emission limits governing 20 power plants. By the end of the fiscal year, the EPA had proposed approval of 11 relaxations, refused seven and remained undecided on two.

In June of '81, the Ministry filed another petition with the EPA and delivered oral and written briefs in support of the States of New York and Pennsylvania concerning interstate pollution.

Later the Ministry also filed an intervention with the State of Indiana Pollution Control Board regarding a submission by a coal generating station seeking to increase its emissions. The Board approved the request by a narrow margin.

In addition, the APIOS Office was involved in a series of tours of the Muskoka/Haliburton Region, Toronto and Ottawa arranged by the Ministry for

groups of visitors from the U.S. The delegates included representatives from the media and members of the staffs of senators and congressmen engaged in the review of environmental legislation.

regional operations and laboratories division

Assistant Deputy Minister — W.B. Bidell

The Regional Operations and Laboratories Division is responsible for policy implementation and the delivery of Ministry services to the public.

This includes environmental protection activities such as abatement programs and complaint investigations, regional environmental assessment activities and the operation of sewage, water and waste projects.

Environment Ontario has divided service to the Province into six Regions: Northwestern, with an office in Thunder Bay; Northeastern, with an office in Sudbury; Southwestern, with an office in London; West Central, with an office in Hamilton; Central, with an office in Metropolitan Toronto; and South-eastern, with an office in Kingston.

These Regional headquarters are supplemented by 23 District Offices across the Province.

Both the District and Regional Offices play a key role in making the Ministry conveniently accessible to municipalities, the public and the organizations which are involved in or affected by its services.

A considerable amount of authority and responsibility is delegated to the Regional Director in the Regional Office. This Office also provides a strong base of administrative rapport and technical expertise to back up the delivery of services within the Region.

The program in the Region is carried out by four sections: Industrial Abatement; Municipal and Private Abatement; Technical Support (Planning and Approvals; Air Quality Assessment; Water Resources Assessment and Laboratory); and, Utilities Operation.

In addition, the Division provides analytical and research support to the Ministry through the operation of Provincial and Regional environmental laboratories.

Northwestern Region

Director: R.M. Gotts

Industrial Abatement

During the 1981-82 fiscal year, two Control Orders were issued requiring both water pollution and air emission abatement. The companies involved anticipate spending approximately \$42 million in the completion of these Orders.

Staff investigated 54 spills and 175 complaints. Routine inspections dealt primarily with the pulp and paper industry and the mining industry.

The Region is continuing to use a mobile toxicity testing laboratory to carry out extensive toxicity tests on effluent samples from all the pulp and paper companies and operating mines plus selective industries. To date over 100 toxicity tests have been conducted. The results of these studies will lead to new requirements in Control Orders and will indicate any improvements in the effluents.

Two new mines are being developed in the Shoal Lake Area, southwest of Kenora. Staff are working with the mining companies and the Province of Manitoba, which draws its drinking water for Winnipeg from that area, to ensure that the mines' operations will be environmentally safe. An inter-ministerial committee representing both Provinces has also been established.

Pulp and Paper

Abatement work proceeded with the eight pulp and paper mills who are under Ministry Control Orders. Significant staff time was spent in reviewing applications for approvals and carrying out audit surveys.

The Region also successfully prosecuted four major industries for excessive discharges into watercourses.



Ministry of the Environment

REGIONS AND OFFICES IN ONTARIO



Regional & District Offices

NORTHWESTERN REGION

Thunder Bay Regional Office,
435 James St. S.,
Thunder Bay P7C 5C6
Tel.: 807/475-1205

Kenora District Office,
808 Robertson St.,
Kenora P9N 1X9
Tel.: 807/468-5578

NORTHEASTERN REGION

Sudbury Regional Office,
199 Larch St.,
Sudbury P3E 5P9
705/675-4501

Timmins District Office,
83 Algonquin Blvd. W.,
Timmins P4N 2R4
Tel.: 705/264-9474

Sault Ste. Marie District Office,
445 Albert St. E.,
Sault Ste. Marie P6A 2J9
Tel.: 705/949-4640

North Bay District Office,
1500 Fisher St.,
Northgate Plaza,
North Bay P1B 2H3
Tel.: 705/476-1001

Parry Sound District Office,
74 Church St.,
Parry Sound P2A 1Z1
Tel.: 705/746-2139

CENTRAL REGION

Toronto Regional Office,
150 Ferrand Dr.,
Don Mills M3C 3C3
Tel.: 416/424-3000

Barrie District Office,
12 Fairview Rd.,
Barrie L4N 4P3
Tel.: 705/726-1730

**Muskoka-Haliburton
District Office,**
Gravenhurst P0C 1G0
Tel.: 705/687-3408

Peterborough District Office,
139 George St. N.,
Peterborough K9J 3G6
Tel.: 705/743-2972

Halton-Peel District Office,
1226 White Oaks Blvd.,
Oakville L6H 2B9
Tel.: 416/844-5747

Huntsville Sub-Office,
100 Main St. E.,
Huntsville P0A 1K0
Tel.: 705/789-2386

SOUTHWESTERN REGION

London Regional Office,
985 Adelaide St. South,
London N6E 1V3
Tel.: 519/681-3600

Windsor District Office,
250 Windsor Ave., 6th Floor,
Windsor N9A 6V9
Tel.: 519/254-5129

Sarnia District Office,
242 A Indian Rd. South,
Suite 209 S.,
Sarnia N7T 3W4
Tel.: 519/336-4030

Owen Sound District Office,
1180 Twentieth St.,
Owen Sound N4K 6H6
Tel.: 519/371-2901

Chatham Sub-District Office,
435 Grand Ave. W.,
Chatham N7L 3Z4
Tel.: 519/352-5107

WEST CENTRAL REGION

Hamilton Regional Office,
119 King St. W.,
Hamilton L8N 3Z9
Tel.: 416/521-7640

Cambridge District Office,
400 Clyde Rd.,
Cambridge N1R 5W6
Tel.: 519/623-2080

Welland District Office,
637-641 Niagara St. N.,
Welland L3C 1L9
Tel.: 416/735-0431

SOUTHEASTERN REGION

Kingston Regional Office,
133 Dalton St.,
Kingston K7L 4X6
Tel.: 613/549-4000

Ottawa District Office,
2378 Holly Lane,
Ottawa K1V 7P1
Tel.: 613/521-3450

Cornwall District Office,
4 Montreal Road,
Cornwall K6H 1B1
Tel.: 613/933-7402

Belleville District Office,
15 Victoria Ave.,
Belleville K8N 1Z5
Tel.: 613/962-9208

Pembroke District Office,
1000 MacKay St.,
Pembroke K8A 6X1
Tel.: 613/732-3643

Municipal and Private Abatement

One major sewage project was completed in the Northwestern Region in 1981-82 (see Appendices).

Regional Staff dealt with three communities, the Townsites of McLeod and Hardrock and the Community of Madsen, under the Private Systems Grants Program. In all cases new water lines were installed to replace old deteriorated lines. In the McLeod and Hardrock townsites their water lines were connected to the Town of Geraldton water supply system.

A municipal waste disposal site serving the Town of Kenora and the Township of Jaffray-Melick reached capacity and was closed during the year. A tri-municipal site, designed to serve Kenora, Jaffray-Melick and the Town of Keewatin was opened. Nine sites owned and operated by the Ministry of Natural Resources were also closed and seven others opened.

Six waste management studies were completed in the Region, primarily to investigate leachate migration.

Staff were involved in the approval of 10 septic tank systems in unorganized areas. Related septic tank approvals in these specific areas come under the responsibility of the Northern Ontario Public Health Service; however, due to the lack of manpower the Ministry was asked to assist in this program.

Two hundred and seventy-five cottages were inspected in the Thunder Bay District under the Cottage Pollution Control Program. Remedial work was required on 60 septic tank systems.

A water quality study was completed on Kenogamisis Lake which serves as a water supply for two communities. Concern had arisen about arsenic leachate to the Lake from an abandoned gold mine.

Rehabilitation work on the sewage collection system was completed in Red Lake. A major reduction in sewage flows has been experienced through the elimination of the infiltration/inflow to the system.

In late 1981, phosphorus removal equipment was installed at Thunder Bay's sewage treatment plant. This has led to a reduction of phosphorus levels in the effluent ultimately discharging to Lake Superior.

Utility Operations

During the fiscal year, the operating responsibilities of the water and sewage systems of the Town of Keewatin and the water system of the Township of Machin reverted back to the municipalities.

The Region operated 11 water and 15 sewage projects serving approximately 16,000 people with water and over 32,000 people with sewage collection and/or treatment services.

Air Quality

The Region continued routine air quality monitoring, phytotoxicology (vegetation) and snow sampling surveys throughout the year, with particular

emphasis on areas surrounding mining and forest product industries.

The year's highlights included:

- Commencement of a pre-operational monitoring program in the vicinity of Ontario Hydro's thermal generating station at Atikokan. This 200-megawatt power plant is scheduled for commissioning in 1984.
- Expansion of the air quality network to Red Rock and Terrace Bay, in support of Ministry abatement programs in local kraft pulp mills.
- Development of a comprehensive study on the effects of acid precipitation on vegetation and soils in Northwestern Ontario.

In addition, a regional air quality report was released which identified major improvements in air quality in many of the communities surveyed, substantiating the effectiveness of Ministry abatement action.

Water Resources

The Unit continued its monthly sampling of 40 lake and river stations. The stations are concentrated in areas where water quality is affected by industrial and urban activities. In addition, 10 stations were regularly sampled in support of the International Joint Commission's (IJC) program to monitor the quality of water in Lake Superior and the Rainy River.

Twelve lakes were sampled in 1981 under the Regional Lake Inventory Program, which is designed to assess lake water quality relating to potential recreational development. Detailed investigations of sensitive fish habitat, were conducted on two lakes.

Five water quality surveys were conducted in relation to new or rejuvenated mining activities.

As part of the Acidic Precipitation in Ontario Study (APIOS), 490 lakes were sampled throughout the Region to evaluate the relative sensitivity of Northwestern Ontario lakes to acidification.

Approvals and Land-use Planning

During the 1981-82 fiscal year, Staff reviewed proposals for subdivision plans, official plans, amendments and bylaw reviews.

A groundwater report assessing the development potential of estate residential areas in the new Thunder Bay Official Plan was prepared for submission to the City and the Ministry of Housing. Extensive assessment and review was conducted on the City's noise-related development restriction area around the Thunder Bay airport.

Staff were involved in environmental assessments for forest management and for the Little Jackfish River Hydro project. Both developments will signifi-

cantly affect Northwestern Ontario, both economically and environmentally, and extensive Regional involvement will be required for several more years.

Pesticides

During the year, there was a slight increase in the number of exterminator licences and permits for herbicide use issued. This is the result of new forest management agreements, which have shifted the responsibility for reforestation programs from the Ministry of Natural Resources to the individual companies.

In January of 1982, the Region sponsored a training seminar for 50 licensed exterminators working in terminal grain elevators.

Laboratory

The Thunder Bay Regional Laboratory provides chemical and microbiological analytical support for the Northwestern Region. In addition, the Laboratory provides analytical support for the fluoridation and sulphation rate monitoring programs of other Regions.

During the 1981-82 fiscal period, the Laboratory performed 119,000 analyses. The Chemistry Unit carried out 89,000 analyses on 14,000 samples while the Microbiology Unit undertook 30,000 analyses on 13,000 samples. Analytical test loading in the Chemistry Unit increased by 17 per cent over the previous year while analytical test loading in the Microbiology Unit remained at the same level as the previous year.

New chemical analytical capabilities were established for aqueous molybdenum and low level total mercury analyses, and a modified analytical procedure was implemented for aqueous calcium and magnesium analyses. In addition, analytical development studies are nearing completion for aqueous methyl mercury analysis.

In support of a major survey to delineate the Kimberly-Clark, Terrace Bay effluent plume, the capability to quantitatively concentrate *E. coli* and *Klebsiella* sp. in pulp and paper effluents was developed. Several laboratory techniques were slightly modified as part of an ongoing effort to enhance analytical accuracy and laboratory efficiency.

Special Activities

The Northwestern Region was the first Region to acquire a computer and to computerize most of its routine operating activities.

The computer system allows staff to store, modify and retrieve information on water quality, precipitation, spills, complaints, hazardous contaminants, industrial monitoring, both Ministry and municipal wastewater and water treatment plants, air quality, and on control orders issued against a specified company.

Plans are underway to extend the system to the Kenora District Office and to expand the number of terminals in the Regional Office.

Northeastern Region

Director: C.E. McIntyre

Industrial Abatement

During the 1981-82 fiscal year, a Director's Order was issued to control the disposal of woodwaste at a newly opened sawmill belonging to the Green Cedar Lumber Company. Legal action was later taken for non-compliance with the Order and the company was fined \$4,000. Staff were involved in the negotiations and public meetings held in connection with an amendment to a Control Order for Spruce Falls Pulp and Paper Co. Ltd.

Levesque Plywood Ltd. and Canadian National Railways were successfully prosecuted for violating Control Orders. The convictions resulted in fines of \$4,500 and led to the installation of abatement facilities costing approximately \$1.8 million.

Staff participated in consultations regarding the development of six new gold ventures. Due to depressed gold prices, several of these and two other existing operations were temporarily shut down.

Texasgulf, now Kidd Creek mine, opened its \$400 million copper smelter. This facility provides for more than 95 per cent containment of sulphur dioxide emissions.

The Elliot Lake Uranium Mining Camp is meeting the requirements of its Direction Orders issued under the Ontario Water Resources Act. As a result, the water quality of the Serpent River system and Quirke Lake continues to improve.

An investigation was conducted into a number of particulate fallout incidences in Sudbury during the summer of 1981, which coincided with the summer shutdown of the Inco Copper Cliff Smelter and Iron Ore Recovery Plant. Over 100 property damage com-

plaints were received from the public. Although the exact cause of the fallout is still unknown, the investigation has indicated possible remedial activities and suggests areas of additional study. Inco has been requested to submit a proposal for alleviating the fallout problem during its 1982 shutdown.

As required by a previously issued Director's Order, E. B. Eddy Forest Products applied for a Certificate of Approval for new odour and particulate control facilities to be installed by December of 1983. These facilities are part of the modernization/expansion program underway at the Espanola mill.

In June of 1981, a major CNR derailment occurred in the Village of Sundridge. Although most of the 100,000 gallons of gasoline and diesel fuel was lost through the resulting fire, Ministry staff supervised the removal of contaminated soil and some of the product which reached the underlying water table.

Staff are carrying out detailed field investigations on the North Bay-Mattawa phase of Trans Canada Pipelines' pipeline extension from North Bay to Morrisburg.

Staff handled a total of 707 complaints and 286 spill incidents of a minor nature.

Municipal and Private Abatement

Staff were involved in the completion of a private sewage funding project for Missanabie; in the continuation of programs for Whitefish/Den-Lou, Bonfield, and Nobel; and, for new programs in Mindemoya and the Townships of Johnson, Aweres and North Shore. Most of the programs involved the construction or correction of wells, septic tanks and tile beds.

A privatization contract was awarded to Greer, Galloway and Associates to carry out all of the Region's routine private sewage inspections in North Bay and Parry Sound. This was the first time that the Ministry has tried such a venture. It proved successful.

The Belle Vallee sewage plant, an innovative pollution control facility utilizing individual low pressure pumps feeding a common lagoon, was successfully put into operation to serve the community of 150 people.

Joint projects were undertaken by the Ministries of Northern Affairs and the Environment to test drill for water in the Community of Spanish and to construct a water distribution system for the Community of Serpent River.

Staff carried out an extensive investigation into the feasibility of re-establishing a fish population in Four Mile Creek. A train derailment in 1967, involving a spill of metal concentrates, had eliminated an earlier fresh water salmon fishery.

The Ministry of Natural Resources closed three waste management sites and improved five others.

Environment Ontario subsidized waste management studies in the Township of North Shore and in the Town of Little Current and provided funds to improve existing sites and close others in the Sault Ste. Marie District.

A Minister's Report, issued to the City of Sault Ste. Marie, requires the City to take the necessary steps in opening a new waste management site before the existing site is filled to capacity.

Under the Cottage Pollution Control Program, the septic tank systems of 629 cottages in the Township of Archipelago were inspected during the summer of 1981. Thirty-seven of these were identified as having major problems and orders were issued to the owners to have the systems repaired or replaced.

During the year, Staff investigated 105 spills and 508 complaints.

Air Quality

The Northeastern Region operates an air quality network consisting of approximately 145 monitors.

Staff also maintain vegetation surveillance studies throughout the Region on the degree and extent of air pollution injury to vegetation.

During the fiscal year, Staff responded to 119 complaints regarding suspected air pollution injury to vegetation.

Water Resources

The Region maintains 160 water quality stations across the Region, including 38 in the Elliot Lake area.

A study on waste assimilative capacities and aquatic biological impact was completed on pulp and paper rivers. A large recreational lake evaluation program continues in the North Bay/Parry Sound areas.

Inspections were carried out on 1,000 newly drilled wells to ensure compliance with regulations.

The Groundwater Unit evaluated 30 landfill sites for approval and licensing.

Approvals and Planning

In 1981-82, the Unit reviewed 55 quasi approvals under various pieces of legislation, 40 environmental assessment and study reports and 40 landuse planning documents. Thirty Certificates of Approval for landfill and organic soil conditioning sites were issued. Forty applications for Water Taking Permits were reviewed and Permits issued.

Pesticides

Staff investigated 17 pesticide related complaints and inspected the premises of 246 licensed retail and wholesale pesticide vendors.

A two-year study into pesticide residues in wild berries from rights-of-way spray operations was completed and a report is being prepared.

A monitoring program was undertaken to examine the levels of residues of 2,4-D from a Ministry of Natural Resources conifer release program in Adam's Township. The program will give Environment Ontario general background residue data on aerial herbicide programs.

Ten water extermination permits were issued for the control of nuisance aquatic weeds and blackflies. Five special use permits were issued for the control of bats and bees.

Utility Operations

During the fiscal year, the Region operated 22 water treatment plants and 43 water pollution control facilities serving a population of approximately 245,000.

Two water treatment and two water pollution control facilities were also completed (see Appendices).

The sludge utilization program continued with the approval of sites and systems for 12 water pollution control plants. Sludge disposal sites were also approved for five plants.

Southwestern Region

Director: D.A. McTavish

Industrial Abatement

During the year, industry in the Southwestern Region spent \$13.6 million on air pollution abatement measures and \$23.5 million on water.

In the early 1970's, all industries in the Sarnia area were brought into compliance with the regulations regarding sulphur dioxide emissions. For the most part, this resulted in a significant improvement

in the ambient levels of sulphur dioxide measured in the Sarnia area. However, during prolonged periods of southerly winds, the objective for this pollutant continued to be exceeded. This occurred because of the geographic alignment of numerous major industries along the St. Clair River.

To overcome the problem, the Ministry developed a new regulation in early 1981, which requires that industries reduce their sulphur dioxide emissions when the level of the pollutant measured at any one of four monitoring stations in the Sarnia area reaches 0.07 parts per million and weather which is conducive to the elevated levels is forecast for at least a six-hour period. The Lambton Industrial Society and industries in the Sarnia area fund the air monitoring activity and maintain the system.

Since the implementation of the new procedure, the air quality objective for sulphur dioxide has been exceeded only once.

In April 1981, the Ministry learned of the appearance of a black, tarry material which had seeped from the ground in a Sarnia Township schoolyard. Similar material had also been found on residential properties adjacent to the school. Investigations determined that wastes associated with the manufacture of styrene were disposed of in this location in the 1940's. At the time, the site was remote and residential development was not planned for the area.

The Ministry hired a soils consultant to carry out a drilling program to identify the area specifically involved and the depth to which the styrene tars were deposited. Once the location of the wastes was pinpointed, the school board engaged contractors to excavate, remove the wastes and restore the site with clean fill. The wastes were disposed of at industrial waste sites approved for the disposal of these types of wastes.

Municipal and Private Abatement

Twenty-two major water and/or sewage projects were completed in the Southwestern Region in 1981-82 (see Appendices).

Of the 206 applications for private sewage systems received, 196 were granted Certificates of Approval. In addition, 197 severance applications involving 378 parcels of land were inspected and reports prepared for the appropriate authorities.

Staff were also involved with four private sewage grant projects for the Township of Plympton, the Town of Bothwell and the Villages of Dorchester and Tiverton.

Thirteen waste management sites in the Region were improved at a cost of \$70,000. The funds were provided to the municipalities through the Ministry's Waste Management Improvement Program.

The Ministry also funded 50 per cent of three feasibility studies for solid waste management projects in the Counties of Bruce, Kent and Essex.

A new landfill site, in an adjacent township, was approved for the City of Owen Sound.

In 1981, a two-year pilot study was begun on Fighting Island in the Detroit River just south of Windsor. Up until 1980, the 1,200 acre Island was used as an industrial waste disposal site by BASF Wyandotte. The City of Detroit now requests permission to ship its sludge to the Island. The City anticipates that the sludge will improve soil conditions. The pilot study is aimed at gathering information on the effectiveness of such a project through the use of small test plots. If the process is found viable, the project will be made subject to the Environmental Assessment Act.

Approvals and Planning

The Unit reviewed and responded to 153 land use planning submissions. Thirty-four new water taking permits were issued and 51 renewed. Eighty-two pit applications were reviewed representing a four-fold increase over the previous year due to the universal application of the Pits and Quarries Control Act. A total of 11 environmental assessment documents were circulated for comment and 10 responses were prepared to enquiries respecting application of the Regulations to specific undertakings. Five pipeline proposals were assessed and eight applications were co-ordinated by the Unit on 13 sewer and water projects.

The Unit played a lead role in the preparation of guidelines for treating fish hatchery effluent and the regulation of their treatment facilities under the Ontario Water Resources Act.

Air Quality

The Region maintains 107 monitoring stations, including 80 instruments to monitor total suspended particulates, 79 continuous monitors and 78 monthly sampling monitors for dustfall and fluoridation.

Staff issued three major reports on the air quality of the Sarnia and Windsor areas and on Michigan-Ontario transboundary pollutants.

The following special studies were undertaken during the fiscal year:

- Particle size studies were initiated in Windsor;
- A hydrocarbon study was conducted in South Sarnia;
- An investigation of the impact of grain elevators on dustfall levels in Goderich was concluded;
- Studies on the various sources of suspended particulate levels in the Beachville area were intensified; and,
- Monitoring for radioactive particulates was continued in the vicinity of the Bruce Nuclear Power Development site.

Water Resources

Throughout the 1981-82 fiscal year, the Region continued its monthly monitoring of more than 130 river sites.

Groundwater Staff worked with the Water Resources Branch to map the sensitivity of groundwaters to pollution. Maps were completed for 15 per cent of the Region.

Increased emphasis was placed on the threat of agricultural activities to groundwater quality and the Region worked with other agencies to formulate guidelines for safe manure storage.

Considerable time was spent on landfill site investigations. At several sites, off-site leachate migration was noted, although in most cases, there was no affect on nearby wells.

Approximately 1,500 wells were inspected and sampled, either through the complaint-response program, or the well inspection program. The Region worked with the Ministry of Transportation and Communications to restore wells contaminated with road salt. The Region also evaluated radioactivity levels in municipal well supplies, drawing on deeper aquifers. The radioactivity is the result of natural geological conditions.

The Surface Water Unit increased its focus on agricultural impacts on water quality. Water quality of the intensively farmed Avon River Basin was assessed as part of the Stratford-Avon River Environmental Management Project.

A major study on Rondeau Bay revealed that agricultural drains and agricultural landuse practices must take greater account of soil conservation and environmental protection measures.

Studies carried out in the Bighead and Beaver watersheds in Grey County confirmed the high quality of waters in the northern part of the Region, and hence the need for protection. As fish hatcheries threaten stream quality in the Grey-Bruce area, the effluents from several hatcheries were assessed.

Monitoring of the Listowel artificial marsh continued.

Laboratory Operations

The London Regional Laboratory performed 176,971 chemistry tests on 19,718 samples and 50,288 microbiological tests on 16,972 samples.

Aeromonas hydrophila was added to the list of parameters available in the Microbiological Section.

Utility Operations

The Section operates 99 treatment facilities

including 48 lagoons, 26 water supplies (17 are surface water sources) and 25 mechanical sewage treatment plants, serving a population of 740,000.

West Central Region

Director: G.H. Mills

Industrial Abatement

One Control Order and an Amending Control Order was issued to Stelco's Hamilton works. The Order covers abatement of both air and water discharges, the cost of which is projected at \$73 million. Dofasco continues to be in compliance with the Control Order it received in 1980.

Staff investigated over 2,100 complaints and 71 spills. Many of the complaints were associated with odour emissions. A number of special studies involving Ministry staff and medical staff from the Ministry of Labour are being carried out in this area.

Sixty-eight Certificates of Compliance were issued to farms.

Several industries in the Region carried out environmental control activities. The following is an outline of some of these:

- The Ontario Rendering Company Ltd., in Dundas, installed a new three-stage chemical scrubbing system;
- Rothsay Concentrates Company Ltd., in Rothsay, completed a program of upgrading and installation of new chemical scrubbers;
- Rothsay Concentrates started construction of a new wastewater treatment facility scheduled for start-up in the summer of 1982;
- Ontario Paper Company, Thorold, installed an activated sludge wastewater treatment plant;
- General Abrasives Company developed and installed new technology for the manufacture of silicon carbide. The manufacture of this product by abrasive industries has long been a source of particulate and gaseous emissions in the Niagara area. Once this facility is operating satisfactorily, it will replace a number of old conventional furnaces; and,
- Cyanamid Inc. achieved control of particulate emission from its fertilizer mill tower and phosphine emissions from another process. It is continuing with an installation to meet requirements of a Control Order on its Welland plant.

While investigating an old disposal site in Cambridge, staff detected contaminants in several private wells. Municipal water supply was provided to the homes affected and paid for by the industries involved.

A vegetable-pulp drying operation run by Niagara Drying Ltd. in Niagara Falls was a source of odour and particulate emission. As a result of a court injunction, the company ceased operations in April, 1981.

Municipal and Private Abatement

Eight Provincial water and sewerage projects were undertaken and completed in the Region during 1981-82 (see Appendices). Funding was provided to upgrade the water supply for St. Williams. Studies were also undertaken to assess the water supply and sewage disposal situations in New Dundee, Linwood, Lynden and Sheffield.

In 1981 Vineland was connected to the De Cew Falls (St. Catharines) water supply and construction was begun on a water supply line to connect the Town of Niagara-on-the-Lake to the City of St. Catharines water system.

The Woodward Avenue Sewage Treatment Plant in Hamilton is now meeting the Ministry's effluent requirements for phosphorus, BOD and suspended solids, following a three-year program of improving the plant's operations. In addition, filter backwash water from the Hamilton Water Treatment Plant is now being redirected to the sewage treatment plant instead of being discharged to Redhill Creek.

As part of their regular duties, staff inspect and monitor water supply and sewage treatment plants and waste disposal sites. A summary of the number of inspections is provided below:

Activity	Number of Plants/Sites*	Number of Inspections
Sewage Works	85	264
Waterworks	155	176
Waste Disposal (Landfill)	90	475
Waste Disposal (Sewage Sludge)	250	578

*These plants/sites are both municipally and privately owned or operated.

Staff responded to over 830 complaints. Most of these involved odour, smoke or particulate emissions, landfill site conditions and watercourse contamination. In the past, smoke emissions from apartment house incinerators were a frequent cause of complaint. As a result, several years ago the Section initiated a stepped-up program of inspection of apartment house

incinerators. Approximately 80 per cent of the apartments investigated were in Hamilton and the vicinity. During this period approximately 20 such incinerators were either forced to close or the owners chose to cease operations rather than upgrade their facilities to meet Ministry standards.

Tests carried out on the closed Kitchener Landfill Site indicate sufficient quantities of methane gas to supply the fuel requirements of a nearby cement plant for many years. The methane will replace the normal natural gas requirements of the company. The project should pay for itself in five years time.

In Hamilton-Wentworth, hydrogeological studies were completed on all old landfill sites and the sites were satisfactorily closed. They will be revegetated and then handed over to the area municipalities. Studies were completed on emissions from the Solid Waste Reduction Unit (SWARU) and the Regional Municipality is implementing the consultant's recommendations.

The Section spent 316 man-days in responding to spills and contingencies.

Staff issued a total of 90 permits relating to pesticides use, inspected the premises of approximately 250 wholesale and retail vendors and investigated 195 pesticide related complaints.

Staff inspected 264 pleasure boats to ensure compliance with the Ministry's regulation governing the disposal of sewage and garbage from pleasure boats. Six boats were found to be in violation.

Air Quality

The Region's air quality network consisted of 195 devices.

The following special air quality surveys or monitoring programs were undertaken:

- Upper Ottawa Street landfill site — Hamilton — air quality monitoring in the vicinity of the site and investigations into aerial transmission of toxic substances and heavy metals;
- Moody's Concrete Products, Ltd. — Lowbanks near Dunnville — nuisance fallout onto private property from a concrete batching plant;
- Robo's Gas Bar — Fort Erie — carbon monoxide and gasoline fumes from an enlarged service station;
- Dolime — Guelph — special survey for excessive amounts of lime dust onto private property;
- Hogg Fuel and Supply — Kitchener — nuisance fallout from a cement silo;
- Stelco Strike — Hamilton — commencement of data accumulation and methodology for a report on strike's effect; and,
- South Cayuga — planning and estimates for air monitoring in the vicinity of a proposed waste disposal facility for toxic substances.

Nineteen complaints, alleging vegetation damage due to industrial emissions, were investigated and

reported on by the Phytotoxicology Section of the Air Resources Branch. Fourteen were found to be due to natural causes; one was due to salt spray from highway de-icing operations; another was caused by rabbit manure runoff from a farm; two were attributed to the International Mineral Corporation in Port Maitland; and, the fifth to Cyanamid Ltd. in Welland.

The Hamilton Air Pollution Index equalled or exceeded the advisory level of 32 eight times during the year, for a total of 118 hours, including two occurrences during the Stelco strike.

The alert level of 50 was not reached. No values in excess of 32 were recorded in St. Catharines or Niagara Falls.

Water Quality

A stream water quality assessment was completed for the Credit River at Orangeville. A report was prepared and a presentation made to the Environmental Hearing Board on the expansion of the sewage treatment plant at Orangeville.

The water quality of Nanticoke Creek at Townsend and Waterford was also assessed in relation to discharges from the sewage lagoons serving the two municipalities. Studies on the Grand River and at Nanticoke on Lake Erie continued, as did the studies on stormwater and combined sewer overflow effects on Hamilton Harbour and Windermere Basin.

Staff began to study the effects of development pressures on the water resources of the Aberfoyle Creek basin. Major centres of groundwater pumping in the Aberfoyle area for a fish operation and a gravel pit have caused changes in streamflow and interference with numerous water wells and other water supplies. Restoration of affected supplies was completed.

Ninety water quality monitoring stations, six automatic streamflow recording stations, 10 manual stations and 20 observation wells were maintained.

A total of 178 water taking permits were renewed, comprising 166 for surface water and 12 for groundwater. Thirty-nine new permits were issued, 22 for groundwater and 17 for surface water sources.

Thirty-nine groundwater quality and quantity problems were investigated, each of which involved one or more wells. About 900 waterwell records were verified.

Staff investigated 12 fish kills and evaluated 15 marine construction proposals.

Environmental Planning

In 1981-82, Staff reviewed two proposed official plans, 77 proposed official plan amendments, two comprehensive zoning bylaws and 14 Environmental Assessment Act related documents and proposals.

Utility Operations

The Region was responsible for the operation of 35 sewage treatment facilities and five water supply systems. The sewage treatment facilities consist of a wide range of types from lagoons to activated sludge plants with tertiary treatment. Water was supplied from facilities using either ground or surface water as sources.

Special Investigations Unit

A Special Investigations Unit (S.I.U.) was established in the Region to provide enforcement capability with respect to the Acts and Regulations.

During the year, the S.I.U. conducted 34 investigations and assisted other Sections with an additional 20. Administration of a waybill program resulted in 299 waybills being investigated.

Niagara River Improvement Program

As a result of continuing public concern about Niagara River water quality, the Section has increased its monitoring and sampling program. The "Niagara River Improvement Team" was established, consisting of a co-ordinator and appropriate technical experts. The Team will address the quality of industrial and municipal discharges and the leaching of contaminants from landfill sites or other sources, adjacent to the Niagara River in Ontario and New York State.

Central Region

Acting Director: G. Mierzynski*

Industrial Abatement

During the year Central Region Staff issued five Control Orders requiring companies to install specific equipment or to take specific action under the Environmental Protection Act. A total of 274 spill incidents and 3,681 complaints were investigated. The majority of complaints concerned odours.

Numerous industries in the Region were involved in pollution abatement activities. The following is a brief outline of some of these projects:

- Eldorado Nuclear Ltd., Port Hope, has installed control equipment, costing approximately \$1.5 million, at its Uranium Hexafluoride facilities to comply with the Provincial air quality criteria for fluoride emissions. The company is also engaged in an expansion of these facilities. At the request of the Ministry, the Atomic Energy Control Board has withheld approval of the construction application pending consideration of an accident analysis;
- The Raybestos Manhattan Company, Peterborough, completed major control facilities to reduce its emission of asbestos to meet Provincial guidelines;
- Gulf Canada at Clarkson has reduced its odour problems through the completion of a \$1.8 million flare gas recovery system to reduce hydrogen sulphide and sulphur dioxide emissions;
- Anachemia Solvents Ltd., Mississauga, reduced its odour emissions by improving its product handling and tank farm dyking operations and by installing a computerized warning system for tank level control;
- The F.W. Fearman Company Ltd., Burlington, a slaughterhouse and meat processing plant, installed a chemical scrubber to reduce odour complaints;
- The St. Lawrence Cement Company, Mississauga, completed the installation of electrostatic precipitators on one of its kilns at a cost of \$4 million to reduce dust emissions. In addition, \$700,000 was spent on 30 baghouse installations to reduce dust emissions from loading facilities and transfer points;
- The West Cane Sugar Company, Oshawa, constructed a building for its bulk product storage at a cost of \$2.5 million to prevent contamination of Oshawa Harbour;
- Ontario Hydro installed an oil precipitator at its Pickering Generating Station to minimize discharges from its oil storage handling areas at a cost of \$108,000;
- St. Mary Cement Company, Bowmanville, installed baghouses at a cost of \$135,000 to control dust emissions from its truckloading and product conveying systems;
- Surpass Chemicals Ltd., Scarborough, added drip traps and completed dyking in the tank farm area and installed an oil interceptor system to handle storm drainages from its plant yard at a cost of \$350,000;

- Mintex Brake Product, Etobicoke, installed a new baghouse to control asbestos emissions at a cost of \$135,000;
- Southam Murray printing, North York, installed catalytic incinerators to control odour and dust emissions from printing operations and installed a garbage compactor at a cost of \$125,000;
- York Litho Ltd., Etobicoke, installed a catalytic incinerator to control odour emissions from its printing operations at a cost of \$150,000; and,
- Jacuzzi Canada Ltd., Etobicoke, installed a new baghouse to control dust emissions at a cost of \$100,000.

Staff handled four major spills during the year. In Medonte Township, a train was derailed and a fire broke out in the vicinity of a tank car containing anhydrous hydrofluoric acid. Staff were involved in on-site co-ordination activities to establish air quality and hazardous levels of gases and to develop a model for an evacuation zone in the event of gas escape. Staff also supervised the monitoring of streams and private wells and the disposal of the clean-up material.

Staff were also involved in the evacuation of the Yonge-Eglinton Centre in Toronto after a PCB transformer failure and in the subsequent clean-up action.

A warehouse fire in downtown Toronto, involving approximately 80 drums of nitro cellulose material, resulted in the release of toxic gases and an explosive condition. The surrounding area was evacuated.

Extensive clean-up work was undertaken after lightning struck an Ontario Hydro transformer in Toronto exploding two PCB transformers and 160 PCB capacitors.

Municipal and Private Abatement

Eleven major water or sewage works were completed in 1981-82 at an estimated cost of \$40 million (see Appendices).

In the Muskoka-Haliburton recreational area 635 private sewage systems were inspected on Morrison, Muskoka, Sunny and Salerno Lakes. In addition, Staff carried out 4,779 inspections involving the installation of septic tanks and holding facilities in the District of Muskoka.

By the end of 1981, a sewage works project was completed in the Town of Huntsville to serve the Hidden Valley area. The project opened the area for development and relieved the concerns of citizens with regard to water quality in local lakes.

Staff dealt with six private systems correction programs in the Town of Caledon at Alton, the Township of Scugog at Manchester and Greenbank, the Town of Pickering at Clairmont, the Township of Smith at Bridgenorth and the Township of Georgian Bay at Mactier. In the case of Mactier, the program was completed by the end of 1981.

G. Mierzynski was appointed Acting Director of the Central Region while D.P. Caplice attended the Department of National Defence's Senior Officers Training Program from September, 1981 to August, 1982.

In 1981-82, Staff inspected 1,578 communal water and sewage works and 377 sites receiving processed organic waste (digested sludge) from sewage works. They also conducted 1,190 inspections of waste disposal sites.

During the year, two waste sites were opened in the Townships of Otonabee and Mara. In Metropolitan Toronto, two major transfer stations were opened: the Scarborough Station with 1,000 tons a day capacity and the Unwin Station of Waste Management of Canada Incorporated in downtown Toronto with a 1,200 tons a day capacity.

In the summer of 1981, a public hearing was held on an application from York Sanitation Company Ltd. for approval of an expansion to their landfill site No. 4 in Whitchurch-Stouffville. Staff undertook extensive sampling of the area at the request of the York Regional Health Unit and concerned citizens. Meetings were also held with the Mayor, the Town's consultant, representatives of the citizens and the York Regional Medical Officer of Health. Reports were prepared and often hand-delivered to concerned parties.

In the spring of 1982, following a formal review of the proposal, the application for expansion was rejected.

observation wells. The following Conservation Authorities assisted Ministry staff in the collection of water samples: South Lake Simcoe, Metropolitan Toronto Region, Credit Valley and the Halton Region.

The water quality monitoring program on Lake Simcoe was continued. During the ice free period, 10 lake stations plus one on the Lower Holland River were sampled. Additionally, a weekly winter monitoring program was conducted at four lake stations.

Staff conducted water quality assessments on 14 lakes within the District Municipality of Muskoka. The Muskoka District Planning Unit, in co-operation with the Region, carried out water quality assessments on an additional 35 lakes.

Seventy-six lakes were involved in the cottager's self-help program.

Information on pH and alkalinity levels was obtained for 75 lakes in the District Municipality of Muskoka and the Provisional County of Haliburton and the County of Victoria.

The Groundwater Group was involved in the environmental impact assessment of 56 abandoned, active or proposed municipal and industrial landfill sites, and sludge disposal sites. The most complex assessments were associated with the Keele Valley (Maple Pits), Stouffville and Seymour Township landfill sites. Twenty-nine groundwater quantity and 114 groundwater quality investigations were also carried out.

Planning and Approvals

The Environmental Planning Staff noted a decrease in plans circulated to the Region, although environmental assessment reviews and consultation increased slightly. Staff became increasingly involved in liaison with municipalities in environmental planning matters.

The following chart outlines the review activities of the Section:

Plans of Subdivisions Reviewed	386
Official Plans and Amendments	238
Quasi-approvals (Niagara Escarpment Commission, Parkway Belt, Pit and Quarry, etc.)	38
Environmental Assessments Reviews, Pre-submissions, Consultation	39

Under Section 40 of the Ontario Water Resources Act, Staff issued the following Water Taking Permits for the regulation of water use:

	Ground- water	Surface Water	Total
New Permits	12	17	29
Renewed Permits	13	45	58
Letters of Approvals	20	4	24
	Total		111

Staff also issued 383 Certificates of Approval for industrial emissions into the atmosphere and 16 Certificates for emissions to water.

Utility Operations

The Region operates 19 sewage plants and 14 water plants serving a population of 530,000. During the year, the Wasaga Sewage Treatment Plant was completed and placed in operation. In the case of the largest project – the South Peel water and sewage facilities – the sewer area was expanded to include the Towns of Bolton and Caledon. This step removed an effluent discharge to the Humber River.

Southeastern Region

Director: R.E. Moore

Industrial Abatement

During the 1981-82 fiscal year, Regional Staff investigated 779 complaints and 154 spills and carried out 1,583 routine inspections. These dealt primarily with odours, noise, gasoline and other contaminants affecting groundwater and wellwater quality.

Staff also helped to resolve several groundwater contamination problems involving gasoline and whey.

One Control Order was issued during the year to C.I.P. at Hawkesbury requiring the company to reduce its air emissions. C.I.P. anticipates spending \$3.8 million on these pollution abatement measures.

Several industries in the Region undertook environmental control measures. The following is an outline of some of these activities:

- Kraft Foods installed a \$1.6 million dollar wastewater treatment plant, involving an aerated lagoon, at Ingleside;
- Ivaco Limited installed an upgraded dust collection system at L'Orignal;
- Pfizer is neutralizing its effluent and BASF is improving the operation of its maleic hydride plant, thereby reducing BOD, in observance of Cornwall's sewer use bylaw;

- E. B. Eddy Forest Products commenced operation of its new sanitary sewage treatment plant at Ottawa;
- Chromasco at Haley's Station installed a baghouse to reduce dust emissions;
- Gloucester Sand and Gravel closed its landfill site due to leachate problems;
- Strathcona Paper installed a clarifier to reduce suspended solids levels in its effluent; and,
- Several quarries changed their blasting techniques to reduce noise levels.

Staff were also involved in the cleanup of 40,000 litres of oil from Deloro Stellite in Belleville from a nearby marsh.

Municipal and Private Abatement

A number of sewage and water treatment facilities in the Region were improved or expanded during the year (see Appendices).

Throughout 1981-82, much of the work of the Ottawa District Office's Municipal and Private Abatement Section involved private sewage systems. Staff received 514 applications for systems and issued 493 with Certificates of Approval. Use Permits were issued to 364. Other Offices in the Region issued two Certificates of Approval. Regional Staff also received and made recommendations on 436 severance applications.

During the year, the Ministry committed itself to a total expenditure of \$6 million on 18 private sewage funding projects in Ottawa and Cornwall.

Two waste management sites, both in Pembroke Township, were closed. One site had reached capacity and the other, a very old site used for the disposal of digested sludge, did not have a Certificate of Approval.

Two new sites, in the Townships of North Crosby and East Hawkesbury, were opened. Approximately 21 sites were improved through the Ministry's Waste Management Improvement Program.

Three area waste management studies were undertaken for the Townships of Rockland/Clarence, Smith Falls and Sherwood, Jones and Hagarty.

The City of Cornwall Fire Department expanded its gas monitoring program to include testing of 31 establishments located in bark-filled areas known to be producing methane.

Approximately 259 complaints regarding wells were received and investigated by Staff. In addition, three well drilling educational programs were conducted for over 90 drillers.

With phosphorus removal facilities now operational in Perth, improvements are expected in the water quality of the Tay River, which has a high recreational usage. These improvements are expected to have a high degree of public perception.

Air Quality

The Region maintains telemetered, full-instrumented National Air Pollution Survey (NAPS) stations in Ottawa and Cornwall and a COH (coefficient of haze) and SO₂ (sulphur dioxide) continuous monitor at Kingston for ambient air monitoring. Source-oriented continuous monitors are also maintained at Hawkesbury for SO₂ from CIP, and at Cornwall for Total Reduced Sulphur from Domtar. These monitors are used to support Control Orders.

In the past year the Hawkesbury monitor was automated to provide reliable data with a minimum of technician service time. The Ottawa NAPS station will be fully automated during the summer of 1982.

Using the Regional computer access terminal, programs were developed to access air quality data stored in Downsview. Regional air quality data can now be retrieved in the form most appropriate for intended use with little time loss.

Water Quality

Groundwater Staff undertake approximately 130 investigations per year of groundwater contamination and/or interference complaints. The Region's aquifers are highly susceptible to contamination owing to the shallow soil cover and underlying fractured limestone. The typical contamination complaint involves one or more private wells contaminated with a hydrocarbon or salt. Groundwater interference problems are normally associated with dewatering operations at quarries.

In addition to complaint investigations, Staff completed 53 site inspection reports associated with sewage sludge spreading proposals and inspected 90 existing or proposed landfill sites.

Comprehensive water quality studies were completed and the findings reported for 104 of the Region's inland lakes.

The cottagers' self-help lake sampling program now includes over 90 cottager-sampled lakes. Three of these lakes have been sampled continuously for the past 10 years and sampling on 54 of the lakes has been ongoing for four or more years.

Regional sampling associated with the Acidic Precipitation in Ontario Study was carried out on 664 lakes over the past three years. The results indicate that 268 of these lakes are sensitive to acid precipitation. Three of these lakes have negative alkalinities and are considered to be acidified.

Staff collected fish for contaminants analyses from 89 bodies of water in Southeastern Ontario.

Routine river sampling is carried out at 93 locations throughout the Region as part of the Provincial Water Quality Network of water quality monitoring stations.

Two River Basin Management Studies are currently in progress. The South Nation River Basin Development Study funded under the Eastern Ontario Subsidiary Agreement is nearing completion. Its pri-

mary focus is on agricultural drainage and flooding with a lesser emphasis on water quality. The Rideau River Stormwater Management Study, supported by Lottario funds, is still in progress with the primary focus on bacteriological water quality as related to stormwater discharges.

The Bay of Quinte interagency study continues. It involves a comprehensive study of the response of the Bay to point source municipal phosphorus discharge reductions. Water quality conditions, as well as the fishery in the Bay, have significantly improved since municipal controls were implemented.

The bulk of the surface water river survey efforts have been directed towards assessing the impact of point source waste discharges and determining abatement requirements necessary to achieve Provincial Water Quality Objectives.

Planning and Approvals

The Unit examined 123 Official Plans and Amendments, 639 zoning bylaws and amendments, 107 subdivisions, and 29 miscellaneous planning policies. A total of 283 applications for approval under Environment Ontario's legislation and 262 applications related to programs of other agencies were reviewed. The number of environmental assessment reviews totalled 88.

Staff provided assistance to the Ontario Energy Board during its intervention into the National Energy Board hearings on the North Bay-Quebec border pipeline to be constructed by Trans Canada Pipelines. In addition, Staff were also involved in decision-making processes regarding the City of Kingston's sludge disposal, the City of Ottawa's snow disposal and Celanese Canada Inc.'s solid waste disposal facilities.

Laboratory Operations

The Kingston Regional Laboratory performed 106,000 chemistry tests and approximately 53,330 microbiological tests.

Procedural improvements were made in iron analysis and in nutrient analysis to permit smoother work flow and to reduce the technician time associated with these tests.

Quality auditing of drinking water supplies represents over 80 per cent of the workload of the Microbiology Lab. This is to ensure that the Ministry meets the needs of those responsible for disinfecting and distributing water supplies. The reporting and tabulating of results has been computerized to the point where monthly and annual tabulations are prepared within a few days of the end of the period in question.

Utility Operations

The Region operated 43 sewage projects, serving a total population of 194,900, and 24 water projects, serving a total population of 56,800.

Laboratory Services Branch

Director: G.C. Ronan

Analytical Test Production

The Laboratory provides input to sampling survey planning, expertise in data assessment, and a wealth of analytical data. Table 1 shows this year's test load summary compared to last year's.

Clients and Programs

The Laboratory's clients consist mainly of the Regions and the Environmental Assessment and Planning Division. Close to 65 per cent of the overall test production in the Ministry was in support of Regional activities.

The 1981-82 fiscal year saw a continuation of the high laboratory usage for major programs, including the Acidic Precipitation in Ontario Study (APIOS). Over 173,000 tests for anions, nutrients, metals, and microbiological parameters on a wide range of sample types (precipitation, fish, algae, and soil) were performed in support of this growing program.

Organic analyses continued to have a high pro-

file and increased demand. Besides large-scale monitoring programs such as trihalomethanes in water and PAH's in air, extensive organic analysis was required in problem solving and contingency situations for Regional and Head Office groups. The water monitoring program for Niagara-on-the-Lake and St. Catharines was the largest single user of the Mass Spectrometer-GC system, while analysis of organics associated with landfill sites and industrial wastes monitoring were other major users of the increasingly sophisticated organic analysis capability of the Laboratory. Concern about toxic material issuing from the Niagara Falls, New York area also resulted in a high demand for tests of drinking water for dioxin, PCBs and Mirex.

To support the Ministry's investigations into the York Sanitation landfill site in Stouffville, Staff carried out approximately 25,000 tests at a cost of \$250,000. The purpose of the testing was to obtain a profile of the contaminants present in the site by monitoring on-site observation wells and to check for any migration of contaminants into adjacent wells. Staff were also involved in corroborative testing by private labs and in extensive water quality monitoring of off-site private wells.

A new priority pollutants analytical testing system was used for the Stouffville study. It entails looking for approximately 90 trace organic compounds and 30 trace metals and inorganics to provide a comprehensive profile of the water quality.

TABLE 1: LABORATORY TESTLOAD SUMMARY
1981-82

Laboratory Sections and Regional Labs.	Chemistry (in thousands)		Microbiology (in thousands)		Total	
	80/81	81/82	80/81	81/82	80/81	81/82
London	180.6	176.9	49.8	50.3	230.4	227.2
Thunder Bay	75.7	89.1	30.0	30.1	105.7	119.2
Kingston	109.8	106.0	51.8	53.3	161.6	159.3
Regional Sub-Total	366.1	372.0	131.6	133.7	497.7	505.7
Inorganic Trace Contaminants	357.1	340.0			357.1	340.0
Water Quality	655.5	688.4			655.5	688.4
Pesticides (Scans)	8.7	10.0			8.7	10.0
Organic Trace Contaminants	91.8	78.0			91.8	78.0
Microbiology			128.9	151.0	128.9	151.0
Central Lab Sub-Total	1,113.1	1,116.4	128.9	151.0	1,242.0	1,267.4
TOTAL	1,479.2	1,488.4	260.5	284.7	1,739.7	1,773.1

In the Pesticides Section, a Finnegan Mass Spectrometer was acquired for dioxin analytical work. The new equipment lowers the Ministry's detection abilities to two parts per trillion (ppt) of dioxin in fish and to 0.02 ppt in water. The Section has developed one of the largest data bases in North America on the distribution of dioxin in Great Lakes fish.

The Water Quality Section saw a major change of focus from marshland studies to the acid rain program. Staff carried out close to 130,000 tests for acid precipitation as well as providing monitoring equipment to other Ministries to examine the effects of acid rain on remote lakes. In the spring of 1981, Staff also held a symposium on electron microscopy for 120 university and government scientists.

Energy dispersive x-ray fluorescence equipment was in use in the Inorganics Trace Contaminants Section by early 1982. The equipment is used to detect trace levels of metals in air particulates. The Section also purchased an inductively coupled plasma emission spectrometer which permits staff to test for 24 metals simultaneously on a wide variety of sample materials.

In addition, the Section's regular activities shifted from routine monitoring to acid rain monitoring, especially soils and precipitation.

Staff improved the analytical methods for measuring dry deposition and developed a quality assurance program for dealing with the long-range transport of pollutants.

The Laboratory continued to use fish as an indicator of organic and inorganic water pollution. While demands for the analysis of mercury and PCB in fish declined, the analysis of metals such as aluminum, lead and zinc were in increasing demand. Requests for lead analysis in air, water, and vegetation saw a remarkable increase this year, as nearly 50,000 lead tests were completed.

Metals other than lead that had a high demand rate (over 1500 tests each) were zinc, copper, nickel, iron, chromium, aluminum, mercury, arsenic and selenium.

The Microbiology Section released a joint report with the federal government and university groups on the incidents of viruses in the bathing waters of Conservation Areas. Studies were also conducted with other agencies to develop a data base on the mutagenicity of water supplies adjacent to the landfill site in Stouffville.

Major surveys were carried out in Dorset, the headquarters for APIOS, which included microbiologi-

cal work on the decomposition of leaf litter and preliminary work on the effects of pH on nitrogen and sulphur cycles in surface and lake waters.

In addition, Staff continued to use mobile labs to support the Great Lakes studies on inter-connecting channels in Sault Ste. Marie.

The Biohazards Unit expanded the range of tests it is able to carry out for mutagens in water supplies and surface waters. Several new procedures were brought on-line to provide an improved validation for the Ames Test, which indicates the presence of mutagens in water.

Many samples resulted in extensive analytical reports which were used as court evidence, the basis for insurance claims, or supporting information for Ministerial Orders.

Highlights of these studies included:

- Laboratory analytical support identified corrosive air particulates as emanating from a specific point source. Several hundred owners of damaged automobiles received financial compensation.
- Analysis of industrial waste samples were used as supporting evidence in obtaining convictions of waste haulers who were operating illegally; and,
- Photomicrographic evidence provided by the Laboratory resulted in the conviction of the proprietor of a corn grinding operation, which was causing a severe dust problem for neighbours.

Several special ventures were undertaken by the Laboratory this year, including the purchase and design of the Organo-Tracker Unit, which visits sites and collects samples; the construction by the Water Quality Section of a completely self-contained mobile laboratory to support various field programs; and, a major \$400,000 major expansion to the Biohazards Lab, which incorporates additional safety features, isolated air supplies and much needed space.

Administrative Services

The initial implementation of the Laboratory Information System (LIS), a computerized data storage and processing system, began in the fall of 1980. At the end of the fiscal year, approximately 95 per cent of the samples submitted to the Central Laboratory were being handled by the LIS.

TABLE 2: TEST PRODUCTION 1976-82

Year	Regional Laboratories	Toronto Laboratory	Laboratory Services Branch
1976/77	378,000	1,272,000	1,165,000
1977/78	420,000	1,360,000	1,178,000
1978/79	440,000	1,262,00	1,702,000
1979/80	446,000	1,144,000	1,159,000
1980/81	498,000	1,242,000	1,740,000
1981/82	506,000	1,267,000	1,773,000

finance and administration division

Executive Director — G. E. Higham

This Division provides a complete range of support services and control functions to the Operating Divisions required for the efficient operation of the Ministry.

Financial and Administrative Services Branch

Director: W. D. Wood

In 1981, the Branch acquired six computer terminals to increase its efficiency in handling the entire financial program of the Ministry. The new system greatly reduces the time required for the preparation of financial reports and for the payment of documents, such as invoices and travel claims. In addition, 95 per cent of all coding errors are now caught immediately.

The development and implementation of the computerized system, as well as the preparation of a user's guide and the retraining of staff were handled internally.

Energy Savings

Over 30 Ministry cars were converted to propane consumption during the 1981-82 fiscal year. The maintenance and operating expenses of these cars were found to be less than that for standard gas propelled vehicles and their emissions are cleaner. Fuel consumption remains the same.

The Ministry's sewage and water treatment plants, through their pumping operations, use approximately 40 per cent of the electrical energy that is consumed by Ontario Provincial Government operations. Efforts are being made to install the most efficient pumps available to minimize peak demand changes and, to pump when the demand for electrical energy by other users is low. Wherever feasible, Environment Ontario has begun to convert heating in the plants from oil to natural gas.

Capital Financing Office

Co-ordinator: C. D. Mialkowski

Water and Sewage Works

Financial management was provided for 759 projects under agreements with municipalities and industry. The following table is an analysis of the financing of 486 Term Loan Agreements and for 273 Provincially owned works under Service Agreements.

Investment in Water and Sewage Works as of March 31, 1982 (at cost less recoveries)

	1982	1981
	(\$ millions)	
Term Loan Agreements		
Water Works	38.1	38.7
Sewage Works	54.8	55.9
Service Agreements		
Water Works	313.8	306.8
Sewage Works	710.3	715.0
Total Investment	1,117.0	1,116.4

In most cases, the water and sewage plants were also operated by the Ministry. The statutory and contractual activities in this area include: conducting service rate reviews (100 in 1981-82); maintenance of accounting records; the reporting of financial aspects of various water and sewage projects as required by agreements and legislation; assisting municipalities in implementing billing and collecting procedures under various service and term agreements and assisting them in bylaw reviews when requested. The gross revenue generated by these activities in 1981-82 amounted to \$92.3 million.

Cost Sharing Agreements and Grants

Administration of claims under the Canada/Ontario cost sharing agreements resulted in reimbursements of expenditures of \$1.4 million.

Provincial assistance on projects under Service Agreements amounted to \$12.6 million. Direct grants to municipalities amounted to \$59.2 million. In addition, claims processed under the Community Services Contribution Program amounted to \$51.1 million.

Systems Development

Manager: G. Scanlon

In 1981-82, this Section, in conjunction with

User Branches, worked on a wide variety of projects. The following are brief descriptions of some of these:

- New Air Quality Telemetry System. A study was initiated to determine the feasibility of developing a new Province-wide system.
- Laboratory Information System (LIS). Modifications were made to enhance the performance of the system.
- Regional Distributed Data Processing System (RDDPS). Four mini-computers were acquired for the Southern Regions to form part of the overall Regional distributed system.
- Industrial Monitoring Information System (IMIS). A new system was developed for the six Regions to assist them in their pollution abatement activities. Implementation is planned for the up-coming fiscal year.
- New Industrial Waybill Monitoring System. A study was initiated to determine the feasibility of developing a new system to meet the requirements of upcoming legislation.

Internal Audit Branch

Director: E.F. Heath

During the year, the Branch carried on with the implementation of the comprehensive auditing program and continued its multi-year program of conducting operational and financial audits in the Ministry offices and plants throughout the Province.

In addition, 375 audits were performed on three grant programs administered by the Ministry of the Environment, namely the C.S.C.P. Grant Program, the Direct Grant Program and the Grants for the Repairs and Renewal of Private Systems Program. These programs are designed to provide financial assistance to municipalities and agencies for sanitary sewerage and water system projects throughout the entire Province. The audits are performed mainly in the offices of the municipalities.

The total expenditure for these grants for the fiscal year 1981-82 was \$108.8 million.

Information Services Branch

Director: R.J. Frewin

Acid Rain

In support of the Ministry's acid rain program, the 27-minute documentary film "Crisis in the Rain" was completed and in wide circulation in Canada and the United States by June of 1981.

By the end of the fiscal year, the film had been viewed in private showings and on cable and public TV broadcasts by more than one million people in both Canada and the U.S.

The Ministry provided prints of the film to the Canadian Consulates in New York, Chicago, Minneapolis, Detroit, Buffalo, San Francisco, Los Angeles, Cleveland and the Canadian Embassy in Washington for showings to environmental groups concerned about acid rain in eastern North America. Prints of the film have also been placed by the Ministry in some 35 central libraries across Ontario where the print is available to the public. It is also available to the public from two commercial film distribution companies retained by the Ministry for this purpose.

A unique and effective communications activity was the series of tours to the Muskoka/Haliburton Region, Toronto and Ottawa arranged by Environment Ontario in co-operation with the Federal Department of External Affairs and Environment for representatives of the U.S. media, for staff advisors to senators and congressmen engaged in reviews of U.S. environmental legislation, and for delegates from industries and from States concerned about acid rain.

During the summer, two information "open houses" on acid precipitation were staged at the Ministry's acid rain research centre in Dorset. Over 1,500 people attended. A similar "open house" at the Kortright Centre near Woodbridge attracted 1,000 visitors.

Public Meetings

During the year 19 public meetings and information sessions attended by 2,000 people were conducted across the Province, as part of the Ministry's public participation policy relating to Control Orders.

Education

Under the Ministry's Environmental Explorations Program, six university students visited 161 schools, resident camps and provincial parks across Ontario. The program, which runs for 14 weeks during the summer is designed to promote an interest and a concern for our environment and to provide appropriate information to students and adults. Approximately 54,000 people participated in the program. In 1982, a bilingual team conducted this special program in Francophone schools and community facilities.

For the fifth year, the Ministry sponsored an environmental workshop for more than 40 special education teachers at the Bolton Outdoor Education Centre, including advanced level courses for teachers who had attended previous workshops.

The 28th Ontario Industrial Wastes Conference, co-ordinated by the Branch for the Ministry was attended by over 570 delegates.

Special Projects

The Branch staged the following special activities:

- Operation Skywatch. Volunteers from the international organization of women pilots, the "Ninety-Nines", flew patrols along the shores of the Ottawa and St. Lawrence Rivers and the Great Lakes, as part of the Ministry's environmental detection and surveillance activities.
- Displays and Exhibits. The Branch participated in six major exhibits across the Province and provided seven acid rain displays.
- Films. Approximately 15 Ministry films were used in 2,200 showings before a total audience of 86,137 persons. In addition, nine films were booked for 81 showings on television to a total audience estimated at 2 million.
- French Publications. Fourteen of the Ministry's major publications and more than 50 per cent of the information fact sheets are now available in French. In addition, 76 educational publications, including 14 lesson sets, are available in French to teachers.
- Ontario's Fish Testing and Information Program. For the fourth consecutive year, the publications "Guide to Eating Ontario Sport Fish" (Northern Ontario, Southern Ontario and Great Lakes editions) were published. Designed to provide the angler and consumer with the most up-to-date information on possible trace contaminants such as mercury, PCB, mirex and DDT in sport fish, these guides contain test data on over 70,000 fish collected from over 1,100 rivers, lakes and parts of the Great Lakes. Over 200,000 copies of the bilingual booklets were distributed free of charge via government offices and by Brewers Retail and LCBO outlets in vacation areas.

Library Services

In addition to its book-lending and research activities, the Section conducted 1,237 computer searches for scientific material, as required by Ministry staff.

The public reading room in the main library was used by over 1,800 people, most of whom were engaged in research.

Personnel Services Branch

Director: R.E.B. Burns

The Branch completed the initial research stage of the manpower planning program. The program is aimed at developing the skills of future managers and at making employees more aware of the career opportunities within the Ministry.

Environment Ontario held its first career development assessment program for 12 female employees in the fall of 1981. Afterward, each candidate was interviewed to discuss the session and to set new work assignments, which would further career goals.

During the fiscal year, a series of half day orientation programs were held for employees in Toronto, in the Hamilton Regional and District Offices and in the Cambridge District Office. Ministry activities and working conditions were discussed. Other offices will be visited in the upcoming year.

A health and safety handbook was prepared and distributed to all employees.

The Training and Certification Section conducted 57 courses, workshops and seminars, which were attended by 816 Ministry and 998 non-Ministry personnel.

French Language Services

Co-ordinator: N. Vakharia

In 1981, 78 positions requiring bilingual capability were identified and designated. Most of these positions are located in the Southeastern and Northeastern Regions, which have a high concentration of French-speaking people.

Forty-three staff members participated in French-language training programs. Courses, emphasizing environmental terminology, were developed and offered in Sudbury, Cornwall and Toronto.

In the fall of 1981, representatives of various government agencies, including Environment Ontario, visited Franco-Ontarian communities across the Province to promote the French-language services provided by the Government and to make the public aware of the existing bilingual capability in regional offices.

The Environmental Protection Act, The Environmental Assessment Act, educational materials, a film and publications on acid rain were produced in French.

boards and commissions

The Waste Management Advisory Board

Chairman: R.H. Woolvett

The Waste Management Advisory Board was established in 1975 by Order-in-Council to provide advice to the Minister of the Environment on a wide-range of matters relating to the management of waste in Ontario. The Board's Terms of Reference include reviewing and advising the Minister on priorities for action by the Province and on commenting on the effectiveness of existing programs and activities.

During the 1981-82 fiscal year, the Waste Management Advisory Board was comprised of nine members. Nine Board meetings were held over a period of 16 days. In addition, 18 meetings were held by the Board's Committees.

The Board was also involved with the following projects throughout the year:

- The development of guidelines for recovering used motor oil from do-it-yourself oil-changers;
- The development of teaching material for Grades nine to thirteen;
- An update of the Advisory Board's 1976 report, "Urban Solid Waste Generation in Ontario", regarding per capita solid waste generation in Ontario's municipalities;
- A pilot program to educate residents on reducing the amount of waste they generate and on measuring their degree of effectiveness;
- The development of a system to keep track of the flows and recovery costs of secondary materials reclaimed through source separation programs as well as to monitor changes in demand, market prices, costs and the revenues associated with these projects;
- A study to determine the economic benefits of increased material recycling arising from source separation in terms of job or business creation and resource savings;
- A study to determine the methods of increasing the recovery and recycling of waste glass in Ontario;
- Continued monitoring of container use trends for carbonated soft drinks;
- The development of a Board position paper on sanitary landfill in the Province;

- The formation of an ad hoc committee to study, in conjunction with the Pesticides Advisory Committee, various alternatives for handling used pesticide containers; and,
- Partial funding of an Ontario-wide telephone service to provide information on recycling activities throughout the Province.

In addition, the Second Environmental Packaging Design Competition was successfully concluded with over 30 submissions. The competition is open to full-time students enrolled in undergraduate courses in Ontario's post secondary schools. Its basic purpose is to generate greater interest in the environmental implications of packaging.

The Environmental Assessment Board

Chairman: B. E. Smith

The Environmental Assessment Board conducts public hearings on environmental issues under the following legislation:

Legislation	No. of Hearings in 1981-82
The Environmental Assessment Act	2
The Ontario Water Resources Act	10
The Environmental Protection Act	9
Consolidated Hearings Act	5

At the end of the 1981-82 fiscal year, the Board had 18 members.

The Board also publishes its own annual report, which is available upon request.

Farm Pollution Advisory Committee

Chairman: O. Crone

Consisting of four professional farmers, this Committee provides objective assessments of farm environmental situations as requested by Ministry officials. The Committee visits farms to investigate complaints and make recommendations concerning manure storage and spreading, cultivation, yard drainage and ventilation of livestock and poultry buildings.

In 1981, the Committee investigated five hog farms and one cattle feed lot.

The Pesticides Advisory Committee

Chairman: Dr. G. S. Cooper

The Pesticides Advisory Committee recommended a number of regulatory changes which are reflected in Regulation 751 Revised Regulations of Ontario, 1980; evaluated the environmental impact, toxicity and hazard of two new or previously non-classified active ingredients; evaluated 194 newly registered pesticide products and recommended for each a classification for storage, sale and use in Ontario. In addition, 583 obsolete pesticide products declared by the registrants to be no longer available on the market were recommended for removal from the active list of scheduled products.

Thirty-three research proposals were received, of which 25 were funded by the Ministry through the Committee to a total of \$291,680. A two-day seminar, attended by over 70 delegates, was held in January of 1982 so that grant recipients might report their findings. A research report is published annually.

Nineteen committee meetings were held during the year and several scientific reviews were carried out. An assessment of the fungicide captan was submitted to the federal Consultative Committee on IBT Pesticides. All Provincial publications dealing with pesticides were reviewed.

Royal Commission on the Northern Environment*

Chairman: J. E. J. Fahlgren

In 1981-82, the Commission published two major project reports. The first was "The Economic Future of the Forest Products Industry in Northern Ontario". This study identifies major problems and prospects facing important sectors of the Northern Ontario forest products industry, such as markets, manufacturing costs, wood supplies and economic prospects.

The second report, "The Road to Detour Lake: An Example of the Environmental Assessment Process in Ontario", is a case study documenting the process of the application of the Environmental Assessment Act to the access road to the Detour Lake mine site.

**As of January 1, 1982 the administrative responsibilities for the Commission were assumed by the Office of the Attorney General of Ontario.*

The Environmental Appeal Board

Chairman: L. C. DeGroot

Established under the Environmental Protection Act, 1971, the Environmental Appeal Board provides an appeal mechanism for persons affected by certain decisions made by the Ministry of the Environment or local health units. The Board consists of 13 part-time members, including the Chairman, from various occupations and parts of the Province.

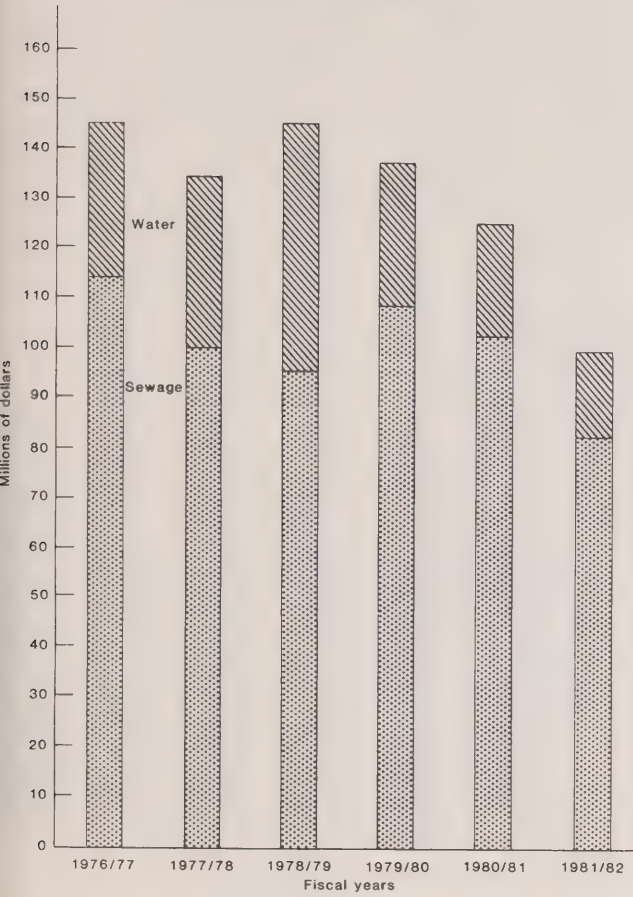
In 1981-82, the Board received 39 valid appeals. Approximately 66 per cent of the appeals concerned decisions of local health units on private sewage systems. The remaining appeals resulted from Ministry of the Environment decisions regarding waste disposal sites, waste management systems, waterworks and air pollution control.

The Board held 36 days of hearings in 1981-82. It resolved 16 of the appeals received during the year as well as five appeals from the previous year. At year-end, decisions remained to be issued or hearings held on 12 appeals.

appendices

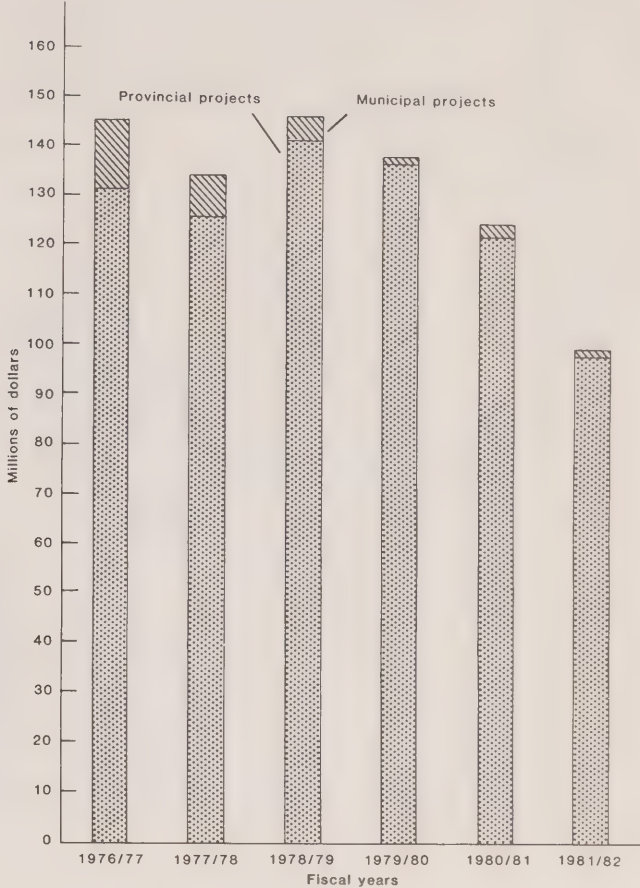
CAPITAL CONSTRUCTION PROGRAM

Annual Total Expenditure by Project Type
(1976/77 - 1981/82)



Graph 1

Annual Total Expenditure by Class
(1976/77 - 1981/82)



Graph 2

Annual Total Expenditure by Project Type

Fiscal Year	Sewage	Water	Total* (\$ millions)
1972/73	54.4	26.0	80.4
73/74	68.4	13.1	81.5
74/75	94.8	32.0	126.8
75/76	114.8	40.1	154.9
76/77	114.8	31.2	146.0
77/78	101.0	34.1	135.1
78/79	96.6	50.7	147.3
79/80	110.6	28.9	139.5
80/81	101.9	21.7	123.6
81/82	82.9	16.6	99.5

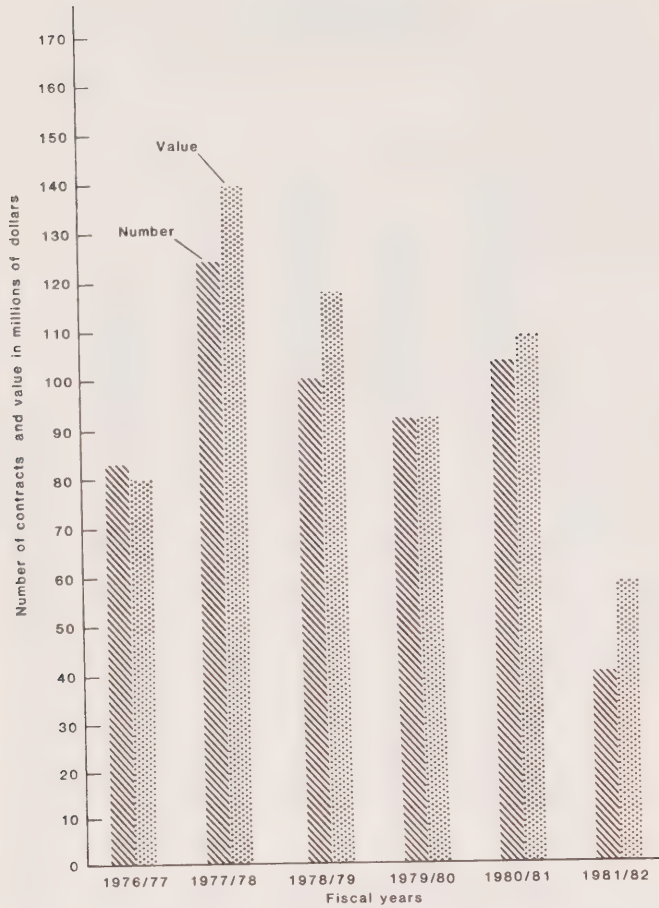
Annual Total Expenditure by Class

Fiscal Year	Provincial Projects	Municipal Projects	Total* (\$ millions)
1972/73	77.6	2.8	80.4
73/74	75.5	6.0	81.5
74/75	115.4	11.4	126.8
75/76	145.2	9.7	154.9
76/77	131.8	14.2	146.0
77/78	127.0	8.1	135.1
78/79	142.9	4.4	147.3
79/80	138.3	1.2	139.5
80/81	121.7	1.9	123.6
81/82	98.0	1.5	99.5

*Includes costs of engineering, property and miscellaneous items as well as contract prices.

CAPITAL CONSTRUCTION PROGRAM

Number and Value of Contracts Tendered Annually
(1976/77 - 1981/82)

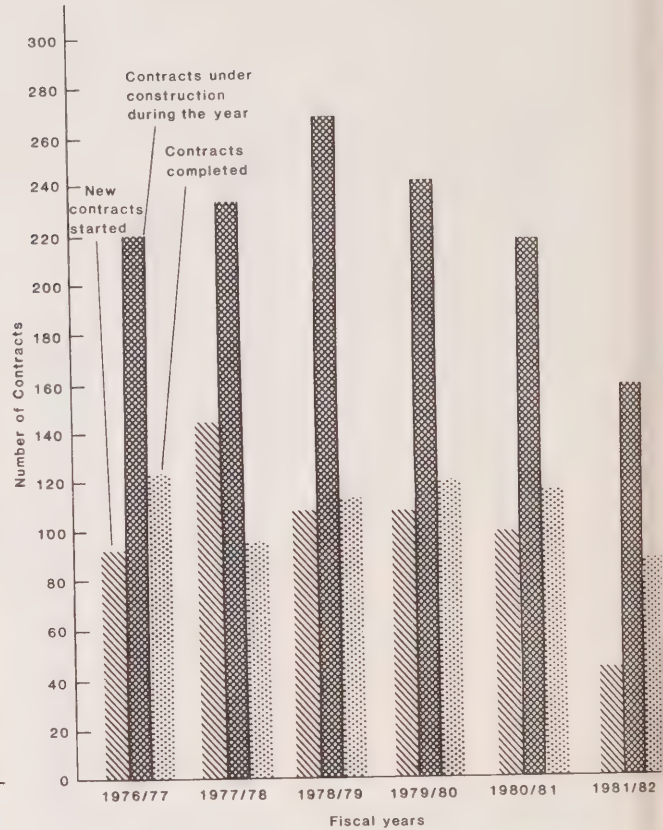


Graph 3

Number and Value of Contracts
Tendered Annually

Fiscal Year	Number	Value (\$ Millions)
1972/73	99	72.4
73/74	108	91.3
74/75	92	84.1
75/76	153	167.6
76/77	84	79.6
77/78	125	140.5
78/79	99	116.3
79/80	93	93.0
80/81	104	110.2
81/82	40	58.7

Annual Volume of Activity
(1976/77 - 1981/82)



Graph 4

Annual Volume of Activity

Fiscal Year	Started	(Number of Contracts) Under Construction Completed	
1972/73	88	166	92
73/74	108	182	82
74/75	102	202	93
75/76	153	262	139
76/77	92	215	124
77/78	145	236	96
78/79	109	249	115
79/80	110	244	122
80/81	97	219	113
81/82	43	149	85

**Northwestern Region
Sewage Treatment Projects
Completed in 1981-82**

Location	Project	Value (in \$ millions)	Provincial Contribution Grant or Subsidy
Improvement District of Balmertown	secondary sewage treatment plant	1.948	Up-front .584
Township of Marathon	sewage treatment plant	2.676	Up-front .748

**Northeastern Region
Water and Sewage Projects
Completed in 1981-82**

Location	Project	Value (in \$ millions)	Provincial Contribution Grant or Subsidy
Little Current	pollution control plant, expansion	est. 4.891	Up-front 2.865
Hearst	water treatment facilities, expansion	3.758	Provincial 2.818
Moonbeam	well and water treatment facilities	.350	MNA .350*
Kapuskasing	Provincial sewage works	6.989	.635

*Ministry of Northern Affairs Grant

**Southeastern Region
Water and Sewage Projects
Completed in 1981-82**

Location	Project	Value (in \$ millions)	Provincial Contribution Grant or Subsidy
Town of Almonte	well improvements	.2	
Town of Hawkesbury	water treatment plant, improvements	.933	up-front .129
Town of Perth	phosphorus removal facilities	.3	
Village of Iroquois	sewage treatment plant, expansion	1.502	Direct Grant .396

Southwestern Region Water and Sewage Projects Completed in 1981-82

Location	Project	Value (in \$ millions)	Provincial Contribution Grant or Subsidy
Harwich Township (Beach)	water system	1.273	Provincial .940
Village of Brussels	sewage system	3.755	Provincial 1.889
Village of Blyth	sewage system	3.321	Provincial 1.886
Village of Ailsa Craig	sewage system	2.574	Provincial 1.434
Village of Thamesville	sewage works	3.444	Provincial 2.142
Village of Thamesville	water works	1.643	Provincial 1.232
Village of Tara	sewage system	2.281	Provincial 1.460
Township of Blandford-Blenheim	sewage system	2.229	1.278
Plattsville	water works	1.159	.869
Town of Parkhill	sewage works	3.448	Provincial 2.238
Town of Mitchell	water system, expansion	.553	Up-front .034
Village of Milvertown	lagoon system, extension	.722	Up-front .255
Town of Kincardine	sewage system	.465	Up-front .058
Village of Grand Bend	lagoon	6.1	Provincial 3.980
Town of Durham	pollution control plant, expansion	1.475	.745
City of London	nitrification facilities	2.362	Up-front .270
City of Windsor	pollution control plant	7.933 phase II 8.857 phase III	Up-front .993 Up-front 1.110
Town of Hanover	pollution control plant, expansion	4.857	Up-front 1.581
Town of Walkertown	sewage plant, expansion	1.321	Up-front .517

**West Central Region
Water and Sewage Projects
Completed in 1981-82**

Location	Project	Value (in \$ millions)	Provincial Contribution Grant or Subsidy
City of Brantford	sewage treatment plant, expansion	10.9	1.367
Township of S. Dumfries (St. George)	sewage treatment plant and sewer system	2.9	1.236
Regional Municipality of Waterloo (New Hamburg)	sewage treatment plant, expansion	1.7	.2
Regional Municipality of Niagara (Fort Erie)	water treatment plant	5.5	.781
(Welland)	water treatment plant	3.9	.528
Regional Municipality of Haldimand-Norfolk (Jarvis and Hagersville)	water supply	4.8	.715
Township of Delhi (St. Williams)	water supply system, upgrade	.1	.07

**Central Region
Water and Sewage Projects
Completed in 1981-82**

Location	Project	Value (in \$ millions)	Provincial Contribution Grant or Subsidy
Town of Huntsville (Hidden Valley)	sewer system	1.667	1.150
Town of Huntsville (Hidden Valley)	water supply	1.747	1.019
Village of Brighton	water supply, extension	.759	up-front .090 M.T.C. .097*
Township of Brock (Beaverton)	sanitary sewers and lagoons	2.178	up-front 1.483

(Continued on following page.)

Central Region Cont'd

Location	Project	Value (in \$ millions)	Provincial Contribution Grant or Subsidy
Township of Brock (Sunderland)	sewer system lagoons	2.234	up-front 1.499
Town of Newcastle (Bowmanville)	Darlington Sewage Treatment Plant	9.346	restructured grant .342
Region of York (Newmarket)	water storage facility	.837	up-front .108
(King City)	elevated storage facilities	.640	up-front .089
Township of Essa (Angus)	sewage system	7.068	Provincial 4.445
Town of Midland	sewage treatment plant, expansion	5.436	up-front .409

**Ministry of Transportation and Communications Grant*

Retirements

The following people retired from the Ministry of the Environment in 1981-82. The Ministry deeply appreciates their years of service and wishes them well in future endeavours.

Name	Position	Location
Over Eight Years		
Mr. L. E. Way	Senior Environmental Officer	West Central Region
Mr. J. E. Mayman	Operator	Lake Huron Water Supply System
Over Ten Years		
Mr. J. F. Kent	Environmental Officer	Southeastern Region
Mr. J. Hrasko	Laboratory Technician	Central Laboratory
Mr. D. S. Aitkens	Manager, Technical Support	Southeastern Region
Mr. G. H. Boileau	Senior Maintenance Technician	Cornwall Sewage Treatment Plant
Mr. W. Williamson	Manager	Waste Management Branch
Over Fifteen Years		
Mrs. L. M. Newman	Senior Data Control Clerk	Air Resources
Mr. N. H. Partridge	Senior Stockroom Clerk	Central Laboratory
Mrs. A. T. Anderson	Administrative Assistant	Environmental Assessment and Planning
Mr. N. Strutt	Accommodations Officer	Financial and Administrative Services
Over Twenty Years		
Mr. H. W. Bradshaw	Caretaker	Brantford Sewage Treatment Plant
Mr. E. L. Percival	Chief Operator	Simcoe/Waterford Sewage Treatment Plant
Mr. J. W. Wardle	Environmental Technician	Central Region
Twenty-five Years		
Mr. M. Lubinski	Approvals Engineer	Environmental Approvals
Mr. B. Stundzia	Water and Precipitation Supervisor	Central Laboratory
Mr. W. Surh	Senior Technician	Central Laboratory
Mr. Y. T. Lambert	Director, Finance/Administration	Royal Commission on the Northern Environment

ONTARIO'S AIR POLLUTION INDEX

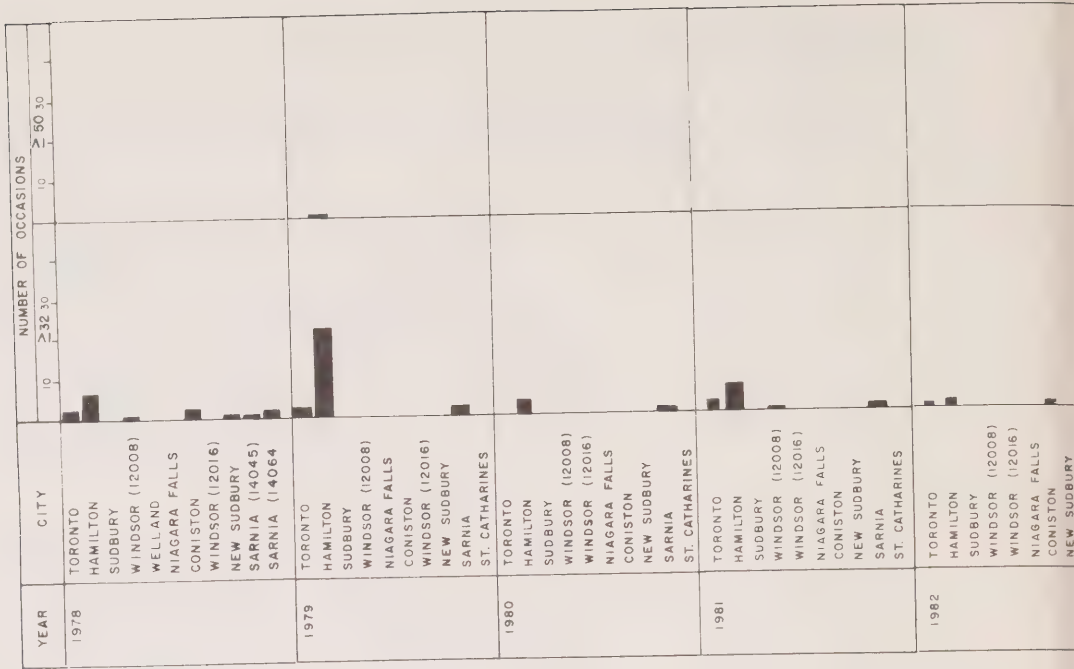
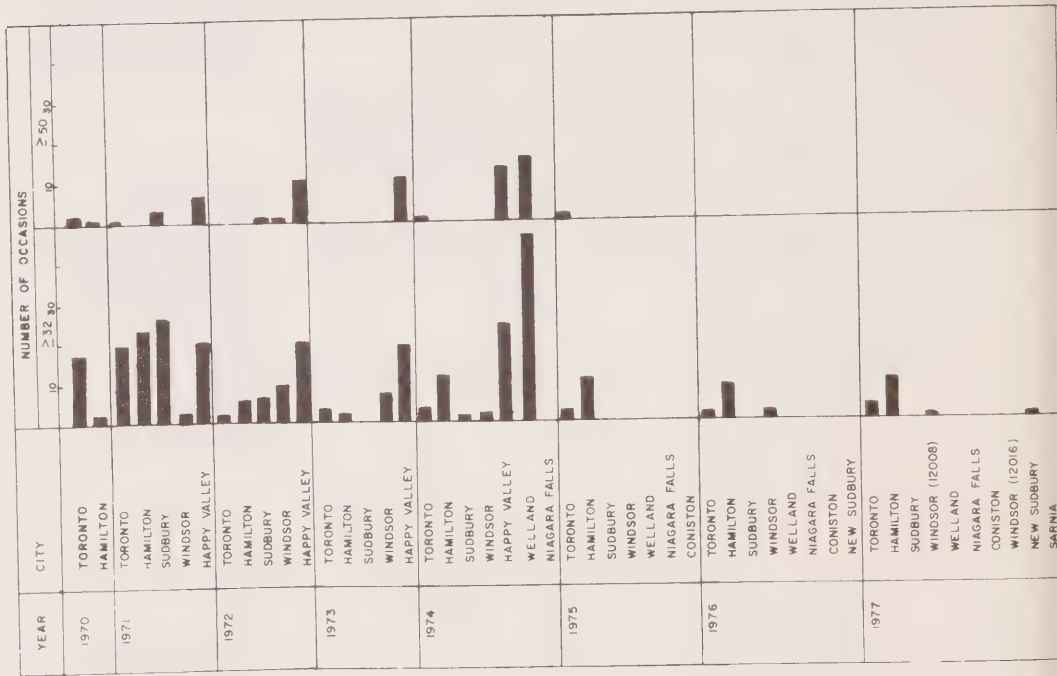
DATE STARTED

TORONTO MARCH 23, 1970
HAMILTON JUNE 15, 1970
SUDBURY JANUARY 16, 1971
WINDSOR MARCH 19, 1971
HAPPY VALLEY MAY 13, 1971
(CLOSED JAN 1975)

WELLAND

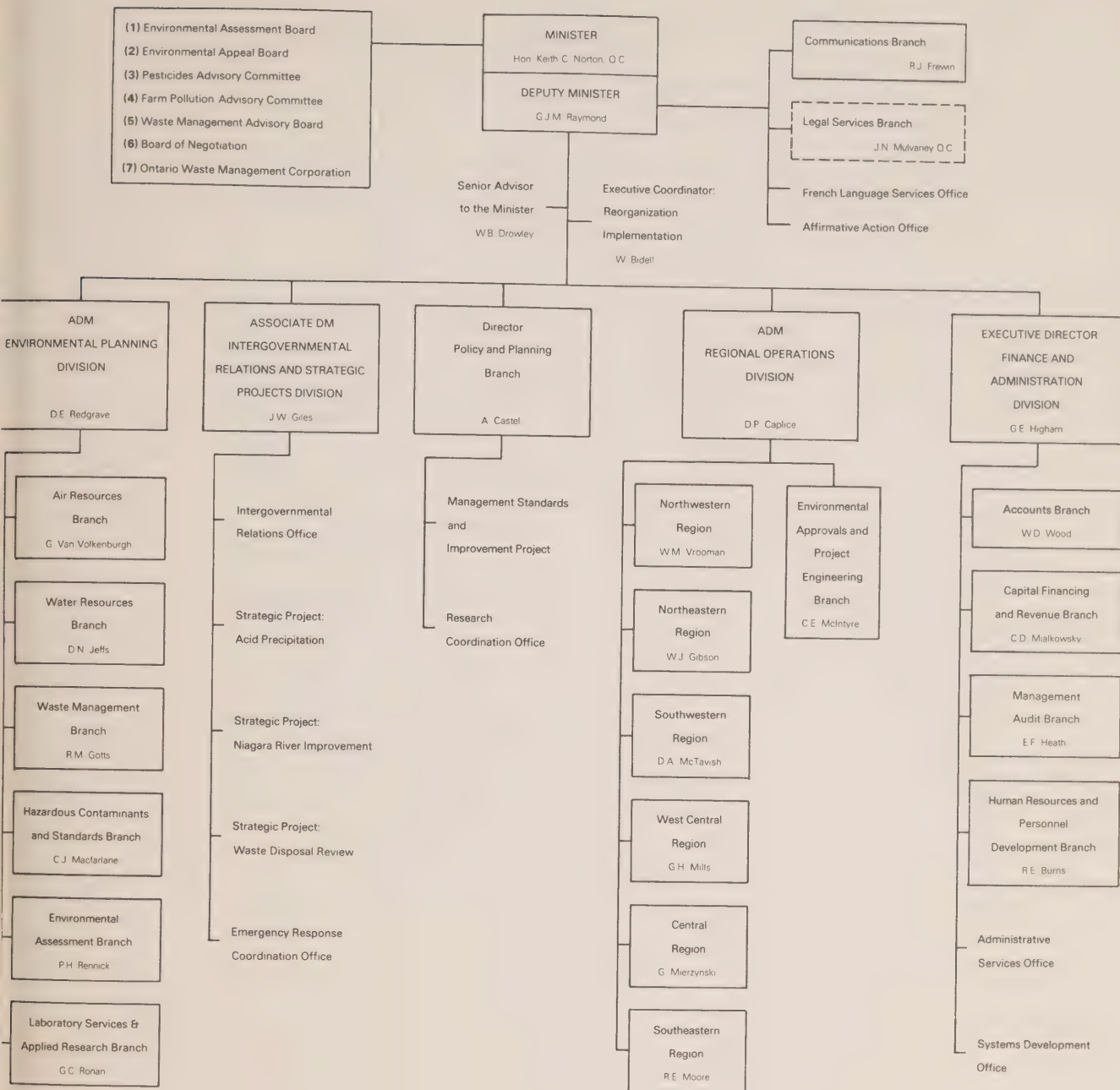
NIAGARA FALLS NOVEMBER 1, 1974
CONISTON FEBRUARY 18, 1975
NEW SUDBURY MARCH 1, 1976
SARNIA (14049) DEC 1, 1977 (CLOSED AUG 30, 1978)
SARNIA (14064) SEPTEMBER 1, 1978
ST. CATHARINES SEPTEMBER 14, 1979

JAN 1, 1974 (CLOSED OCT 26, 1978)



MINISTRY OF THE ENVIRONMENT

January 1, 1983



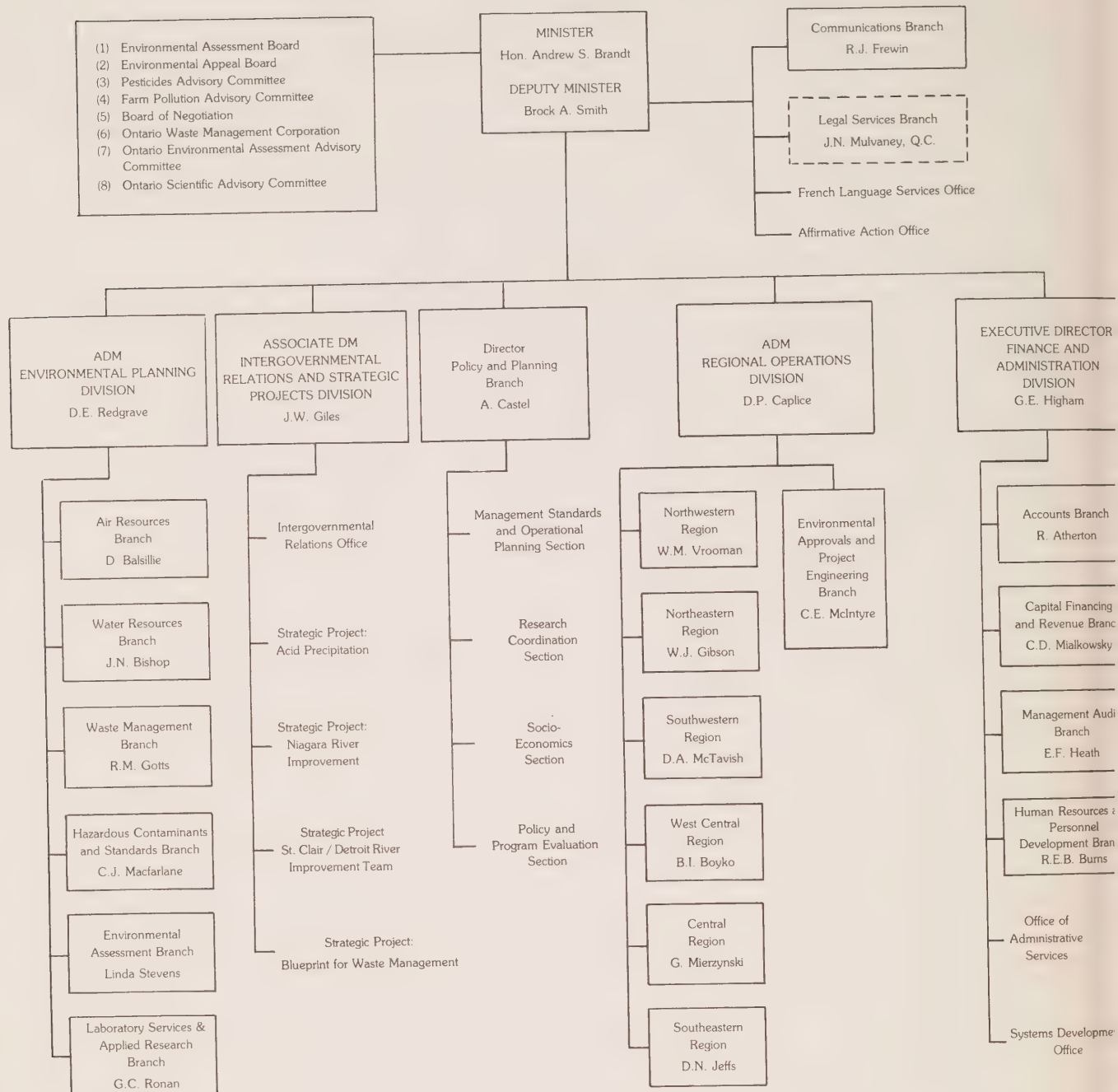
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Annual Report 1982 - 1983



Ministry
of the
Environment

MINISTRY OF THE ENVIRONMENT 1984*



*For Organization Chart, 1983 see inside back cover

contents

Organization Chart	Inside Front Cover
Letters of Transmittal	2
Minister's Message	3
Deputy Minister	7
Policy and Planning Branch	7
Legal Services Branch	8
Communications Branch	8
French Language Services Office	10
Affirmative Action Office	10
Intergovernmental Relations and Strategic Projects Division	11
Intergovernmental Relations Office	11
Acid Precipitation	11
Niagara River Improvement	12
Emergency Response Co-ordination Office	13
Blueprint for Waste Management	13
Environmental Planning Division	15
Air Resources Branch	15
Water Resources Branch	18
Waste Management Branch	22
Hazardous Contaminants and Standards Branch	24
Environmental Assessment Branch	25
Laboratory Services and Applied Research Branch	26
Regional Operations Division	31
Northwestern Region	33
Northeastern Region	34
Southwestern Region	36
West Central Region	39
Central Region	41
Southeastern Region	43
Environmental Approvals and Project Engineering Branch	45
Special Investigation Unit	48
Finance and Administration Division	51
Accounts Branch	51
Capital Financing and Revenue Branch	51
Management Audit Branch	52
Human Resources and Personnel Development Branch	52
Office of Administrative Services	53
Systems Development Office	53
Boards and Committees	55
Environmental Assessment Board	55
Environmental Appeal Board	56
Pesticides Advisory Committee	56
Farm Pollution Advisory Committee	56
Crown Agency	57
Ontario Waste Management Corporation	57
Appendices - Charts and Tables	59
Capital Construction Program	59



To:
The Honourable
Andrew S. Brandt
Minister

Sir,
I have the honour to submit
for your approval the annual
report of the Ministry of the
Environment for the year
1982/83

Respectfully submitted,

Brock A. Smith
Deputy Minister

To:
His Honour,
The Lieutenant-Governor
of the Province of Ontario.

May it Please Your Honour,
I have the privilege to
present the annual report
of the Ministry of the
Environment for the fiscal
year beginning April 1, 1982
and ending March 31, 1983.

Respectfully submitted,

Andrew S. Brandt
Minister

Minister's Message

I am privileged to present this report on Environment Ontario's activities during the fiscal year 1982/83. These activities of the regions, head office and the laboratories speak for the achievements of each.

Since my appointment, I have had the opportunity to tour a number of locations throughout the province where we have special programs under way, and have talked with concerned residents as well as with my staff who are dealing with these specific challenges.

I have also had a chance to meet with the executives of major environmental groups, municipal leaders, representatives from the industrial sector and with environmental officials of other jurisdictions in both Canada and the United States.

In preparing myself, I have learned extensively by direct contact and discussions with the operating staff of the Ministry in our regional offices and in our technical branches at head office as well as with our laboratory scientists in Rexdale. In all instances, I have been impressed by the quality and dedication of the people working in the Ministry.

During 1982/83, the Ministry underwent a major restructuring to meet future-oriented challenges of the '80s, which was a main event of the year.

Our perception of environmental dangers has changed markedly since the late '70s. Earlier, we were mainly concerned with the control and clean-up of pollutants that we could see or smell or were unsanitary.

Great progress was made in treatment of municipal sewage including removal of phosphorus, sanitary landfilling of municipal garbage, and abatement of industrial discharges to air and water.

Today, we are challenged by new and more insidious environmental problems uncovered by new scientific knowledge including great improvements in analytical methods

— acid rain, for example, and newly discovered toxic contaminants in waterways and former landfill sites. The solution of these new problems has called for better co-ordination both internally and with other levels of government. Our reorganization was undertaken to improve internal co-ordination and to improve the Ministry's ability to react quickly to:

- Deal effectively with the minuscule amounts of potentially dangerous material newly detected by vastly improved analytical techniques.
- Deal effectively with damages caused by the long range transport of pollutants across international boundaries.
- Continue its successful fight against traditional forms of water, air and land pollution.
- Improve the use of public participation in the development of environmental standards and conservation/recycling practices.

Since the creation in 1956 of the Ontario Water Resources Commission, now incorporated into the Ministry, the province has expanded its environmental legislation and gained a world-wide reputation for its policies and initiatives to preserve and protect its natural environment.

Advances have been made in many areas, including the following highlighted achievements and current initiatives:

- The air quality of major cities throughout the province has substantially improved as a result of Ministry abatement activities, despite growth and industrial development.
- More than 95 per cent of Ontario residents are now served by water and sewage treatment plants and enjoy an abundant supply of good, safe drinking water.
- Solid wastes are now disposed of in an environmentally acceptable manner and we are seeking the means of reducing our dependency on landfill by improved recycling methods of technology.
- The Ontario Waste Management Corporation has been established as a Crown agency to develop and manage facilities

which will meet Ontario's long-term liquid and hazardous industrial waste treatment and disposal needs.

- Rapid strides have been made in the scientific field as our knowledge and detection capabilities have expanded dramatically. Environment Ontario today has one of the best analytical laboratories in North America.
- A Hazardous Contaminants and Standards Branch has been established within the Ministry to set standards for chemicals and their management for the maximum protection of human health and the environment.
- To address the world-wide need for information on the significance of trace contaminants now being detected, the province is also supporting, along with the federal government and private industry, the establishment of an independent Centre for Toxicology, building on current programs of the University of Toronto and Guelph University.
- Ontario's unique Sport Fish Testing and Public Information Program, which began by telling the public the exact situation with regard to contaminants in sport fish, is now able to demonstrate the results of decisive pollution control action.
- Through the Ministry's Acidic Precipitation in Ontario Study, we have been able to pinpoint sources of pollution and make a contribution toward world-wide scientific understanding and acknowledgement of the acid rain problem.
- Through the establishment of the Niagara River Improvement Team, to monitor contaminants from U.S. chemical disposal sites which threaten Lake Ontario drinking water, we have assumed an active role with our federal government in demanding pollution clean-up in New York State.

There is no doubt that acid rain, the Niagara River and chemical contaminants are major threats to our environment. These issues are indicative of the new concerns facing

the Ministry in the '80s. Therefore, more resources are being channeled to cope with the new forms of pollution, to assess risks, and to deliver regulatory programs where required.

Because of transboundary pollution, we must also endeavor to obtain much more expeditious and concerted abatement action from our southern neighbors.

Ministry scientists have conclusive evidence that 50 to 70 per cent of the acid rain damage to Ontario's ecosystem stems from sulphur and nitrogen pollution caused by electric utility and industrial emissions in the region of the Ohio Valley. We also have conclusive evidence that approximately 95 per cent of the pollution in the Niagara River originates from chemical complexes and disposal sites on the U.S. side of the river. Furthermore, U.S. scientific bodies agree with our assessments.

Ontario, therefore, has no other course but to continue to intervene through legal devices in concert with our federal government in U.S. appellate courts and tribunals about pollution adversely affecting the province's natural environment.

During the past several years, through public relations programs and its Legal Services Branch, Environment Ontario has made considerable headway in terms of raising public consciousness and awareness in the United States concerning these critical issues.

As earlier stated, our new area of environmental concern are associated mainly with chemicals, the consequence of our heavy industrialization and consumer-oriented lifestyle.

Approximately 70,000 industrial chemicals are used in our industrial society around the Great Lakes basin including 2,800 which are commonly used. These figures do not include the hundreds of thousands of compounds formed as byproducts of the manufacturing processes, and during disposal in chemical dumps and in incinerators. Many of these are known or suspected to be toxic.

Ontario has set standards for air and water pollution for over two decades. However, most jurisdictions have set standards for only a small handful of environmental contaminants. This is true of the vast organizations to which we often look

or guidance, such as the World Health Organization and the Environmental Protection Agency of the United States.

Ontario has taken an important step to marshal the knowledge we need in dealing more effectively with chemicals in the environment. We are the first Canadian province to establish a special branch to deal exclusively with hazardous contaminants and standards. Backed up by a substantial allocation of resources, the Ministry is already meeting the challenge by working with specialists in other ministries of the Ontario Government and with its counterparts in the Federal Government.

The Hazardous Contaminants and Standards Branch was established in the summer of 1982 to coordinate development of plans and programs for the control of hazardous contaminants in the environment and to establish standards for the protection of public health and the environment. The development of these standards as they relate to human health will take into account the exposure of Ontario citizens to hazardous contaminants from all

sources — air, water, diet and physical environment.

Many of these contaminants have been in the environment for decades, but were not identifiable. Today, the Ministry measures some contaminants in parts per trillion — a million times more sensitive than detection levels of ten years ago. In fact, environmental scientists have at their disposal analytical methods capable of detecting substances in the part per quadrillion concentration. That is equivalent to a decimal point with 15 zeros after it.

Therefore, it is not surprising that the public is confused by this recent phenomenon which has been labelled "the tyranny of numbers."

It is said that environmental scientists are excited with the astonishing sensitivity of their sleuthing toys. Medical authorities are overwhelmed with the mountainous array of data indicating infinitesimal quantities of compounds for which there is a world-wide knowledge gap on human effects.

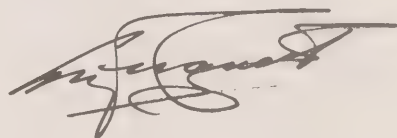
The public, in turn, is bound to be bewildered and confused with the conflicting interpretations being placed

on the health significance of these data. Meanwhile, the news media often carry stories with unscientific and sensational approaches to this data, which only succeeds in arousing unnecessary anxiety in the minds of readers and listeners.

Environment Ontario is doing its best to keep abreast of world-wide developments in environmental protection — and frequently taking a lead in development initiatives. There is no other jurisdiction I know of in North America or elsewhere that has put in place such a broad and full range of programs to preserve and protect its environment.

I will want to put my own stamp on new programs and policies as we progress through new scientific knowledge, the development of new technology programs and control orders as required.

An overview of Environment Ontario's ongoing programs and emerging activities to meet new challenges is outlined in this report under the various divisions and branches of the Ministry. Reorganization is also indicated under each division.



Andrew S. Brandt
Minister

deputy minister

Deputy Minister — Brock A. Smith
Executive Assistant — Mark McKenney

Policy and Planning Branch

Director: André Castel

The role of the Policy and Planning Branch is to identify the broad program and resource needs of the Ministry and to co-ordinate the effective management and efficient utilisation of Ministry resources. There are four main areas of responsibility.

1. The branch analyzes Ministry policies and programs, co-ordinates policy development, and provides liaison with the government's central agencies. In 1982/83, 16 new policies were analyzed and approved. Twenty-five submissions to the Cabinet Committee on Resources Development were prepared including legislative amendments to the Ontario Water Resources Act and the Environmental Protection Act. Two submissions were made to the Cabinet Committee on Administered Prices.

2. The branch develops and maintains the Ministry's strategic and operational planning systems and is responsible for the co-ordination, development and application of improved management processes. In 1982/83, a corporate strategic planning process was developed, and the Ministry's operational planning process was formalized. The Ministry's Management-by-Results (MBR) system was improved to provide better information for assessing current and future environmental needs and for evaluating the accomplishments of ongoing Ministry programs. Moreover, a management improvement plan was submitted to Management Board, and working groups for operational planning, long range planning and management reporting were established.

3. The branch provides socio-economic analysis of proposed environmental policies and undertakings. In 1982/83, the branch continued to assist in the Ministry's efforts in studying acid rain and developing approaches for its control. A computerized linear programming screening model was developed to enable determination of least-cost

abatement strategies for achieving desired levels of acid deposition within or among jurisdictions. In addition, the branch undertook social and economic analyses of proposed environmental policy options in the areas of waste management, environmental standards and pollution control.

4. The branch co-ordinates the

identification of research priorities, allocation of resources to research, and the evaluation of research performance. During 1982/83, the Ministry's formal research planning process was developed and implemented. The branch also produced the Research Advisory Committee annual report and a report on Ministry research accomplishments.

Legal Services Branch

Director: J. N. Mulvaney, Q.C.

During 1982/83, staff of the Legal Services Branch:

- Handled 65 prosecutions before the courts, 36 of which were initiated during the fiscal year.
- Participated as counsel in two lengthy hearings under the Consolidated Hearings Act concerning undertakings by Ontario Hydro.
- Prepared extensive amendments to the Environmental Protection Act and the Ontario Water Resources Act.
- Took part in interventions in U.S. administrative proceedings concerning transboundary pollution with respect to acid rain and Niagara River issues.
- Assisted in the implementation of a summary system of enforcement for minor prosecutions in accordance with the Provincial Offences Act.

Communications Branch

Director: R.J. Frewin

Activities of the Communications Branch support current programs and new initiatives of the Ministry.

The branch provides communication and public information services aimed at keeping the public informed of Ministry policies and activities. During the year, the branch produced and distributed 82 news releases, 50 speeches and statements, and a wide range of publications, reports, newsletters and printed and audio-visual educational materials. It answered thousands of public enquiries by telephone and mail, created exhibits for fairs and arranged seminars, hearings and meetings as part of the Ministry's extensive public participation program.

Acid Rain

Since the inception of the Acidic Precipitation in Ontario Study (APIOS) program, the branch has provided support by initiating communications and educational activities in order to inform the public in Ontario and the United States about the Ministry's scientific, abatement, socio-economic and legal initiatives in this high profile environmental issue.

This support during 1982/83 included these activities:

- An update of the brochure entitled *The Case Against the Rain*. More than 70,000 copies have been distributed here and from Canadian consulate offices in the U.S. and our Washington embassy since 1981.
- An update of the 18-minute videotape, *The Case Against the Rain*. The 27-minute

documentary, *Crisis in the Rain*, won a Gold Camera award at the U.S. Industrial Film Festival in Chicago. This film has been viewed on screen and TV by an estimated audience of 17 million persons in Canada and the U.S.

- An acid rain exhibit package was created for province-wide use.
- Open houses were held in Parry Sound and Sundridge, at the Kortright Conservation Centre near Kleinburg, and at the Ministry's Acid Rain Research Centre in Dorset.
- Tours for U.S. legislators, Congressmen and news media co-hosted by the Ministry, Environment Canada and the Department of External Affairs continued to describe the Canadian perspective on acid rain to U.S. participants, and received coverage in major U.S. print and broadcast media.

Special Projects

- The branch again assisted the Ontario Federation of Angle and Hunters in staging its th annual Pitch-In campaign to clean up rivers, streams, shore lines, trails and back-roads. Approximately 1,000 group participated, cleaning up hundreds of tons of litter and junk.
- For the fourth year, in Operation Skywatch, women pilots flew volunteer environmental patrols along the shore lines of the Ottawa River, S

Lawrence River and the Great Lakes. Skywatch is a joint venture of the Ministry and the Ninety-Nines Inc., the international organization of women pilots. The branch maintains regular liaison with Ministry regional co-ordinators of Skywatch, who provide the pilots with film and equipment and direction for the patrols.

- The branch worked with the Waste Management Branch to introduce the Blueprint for Waste Management program and the supportive public participation program. The information program included 20 seminars in cities across the province to obtain public suggestions and participation.
- The 30th Ontario Industrial Waste Conference, co-ordinated by the branch for the Ministry, was attended by 611 delegates, the highest registration in the conference history.
- In view of growing public concern about the cleanup of the Great Lakes under auspices of the International Joint Commission, and the ongoing Canada-United States and Canada-Ontario water quality agreements, the branch published a booklet entitled *The Great Lakes: Yesterday, Today and Tomorrow* as part of the Ministry's 10-year celebration.

Exhibits

Displays were set up for National Environment Week in June at Ontario City Hall, Ontario Place and Weston. Two display programs were produced to communicate the efforts of Environment Ontario and the Ministry with Lake Simcoe Conservation Authority in controlling phosphorus loadings to Lake Simcoe, which were exhibited at the Barrie Agricultural Centre and other centres in the region. Rain exhibits were staged in shopping malls, fairs and open spaces. A display was provided for the Francophone Centre at Harbourfront, Toronto.

French Publications

Many of the Ministry's major publications and approximately 75 per cent of information fact sheets are now available in French, as well as educational environmental lesson sets for francophone teachers.

Films

Fifteen Ministry films were used in more than 1,800 showings before a total Ontario audience of 64,415. In addition, nine films including *Crisis in the Rain* were booked for 92 showings on television to an audience estimated at 3.5 million to Canada, and a larger audience in the U.S.

Ontario's Fish Testing and Information Program

For the fifth year, the bilingual publication *Guide to Eating Ontario Sport Fish* was published in April 1982. Designed to provide the angler and consumer with information on possible trace contaminants such as mercury, PCB, mirex and DDT in sport fish, these guides contain test data on more than 75,000 fish collected from 1,200 rivers, lakes and areas of the Great Lakes. More than 180,000 copies were distributed free via government offices and by Brewers Retail and LCBO outlets in vacation areas.

Quarterly News Magazine

Environment Ontario's *Legacy* published a special issue in July to celebrate the Ministry's 10th anniversary. A second special issue was published in January to report on the Ministry's corporate reorganization. The magazine is distributed to libraries, schools and environmental groups and to many individuals among its circulation of approximately 22,000.

Education

Under the Ministry's Environmental Explorations Program, eight university students employed during the summer visited 330 schools, resident camps and provincial parks across Ontario. The program, which runs for 16 weeks each summer, is designed to promote an interest in and concern for our environment and to provide information to students and adults. About 80,000 people attended the workshops during 1982/83.

For the sixth year, the Ministry sponsored an environmental workshop for more than 50 special and outdoor education teachers at the Bolton Conference Centre, incorporating an integration of practical field studies and classroom applications.

Library Services

The Library Services Section, consisting of both the main library at 135 St. Clair Avenue West in Toronto and the laboratory library in Rexdale, serves Ministry staff and the public.

During the year, the section responded to 9,363 reference questions, lent 9,415 books, and processed 77,084 photocopies of information material. It acquired 2,575 technical books and documents, subscribed to 199 journals which were widely circulated throughout the Ministry, conducted 658 computer searches for scientific material, and acquired 4,118 U.S. government documents on microfilm.

The growing need to automate the libraries was recognized and staff conducted an extensive review of library needs, computer systems, and other libraries that were automated. Automation will be introduced during 1984/85.

French Language Services

Co-ordinator: N. Vakharia

Highlights included:

- The Environmental Assessment Board developed and implemented a policy on French language services ensuring bilingual public hearings.
- A review of existing forms and documents established priorities for translation. The translation is underway.
- "FAITS: Environnement Ontario — Services" was developed to accommodate requests for information in French. This fact sheet lists professional/technical personnel capable of assisting French-speaking residents.
- A lexicon on environmental terminology was developed to assist Ministry staff in providing services in French.
- A central fund of \$20,000 continued to provide French language training for 47 Ministry staff members. A special course, *Le Français de l'accueil*, was developed to improve telephone and reception services to the public in French.
- Direction Jeunesse received a grant of \$5,000 to organize Week-End Environment, a three-day training session on environmental issues.

Affirmative Action Office

Affirmative Action

Program Manager: A. M. Clark

In 1982/83, 26 women participated in career development initiatives of which 12 were on developmental assignments of three months or more. For the first time the largest number of participants and largest amount of staff training and development dollars were in the technical/professional courses.

Teleconferencing and monthly meetings were held with regional and head office representatives of the Ministry's Women's Advisory Committee. Newsletters were published, and counselling sessions held with interested staff.

The program sponsored a second Career Development Assessment Centre for six females and six males from the scientific, resource management and environmental technician areas of the Ministry. The centre evaluated five management skills in order to identify employees with management potential. The results will be used to help develop career plans. The Ministry also hired women to fill several positions not previously filled by women.

intergovernmental relations and strategic projects division

Associate Deputy Minister: J. W. Giles

This division co-ordinates the Ministry's approach to designated political issues and to intergovernmental activities.

It also assists in the development of the Ministry's position to resolve pollution problems shared with national and international jurisdictions and develops bilateral and multilateral agreements in support of ongoing control strategies.

The division is composed of:

- the Intergovernmental Relations Office
- the Acid Precipitation Project
- the Niagara River Improvement Project
- the Emergency Response Co-ordination Office
- the Blueprint for Waste Management

Intergovernmental Relations Office

Environmental and
Technical Advisor: W. A. Steggle

The Intergovernmental Relations Office provides advice respecting the Province's environmental policies and programs and their co-ordination with those of other governments. Activities include negotiation of intergovernmental agreements and supervision of their implementation as they relate to resource development and air and water pollution.

The Canada-Ontario Accord on Environmental Protection and the Great Lakes Water Quality Agreement are examples which require co-ordination of U.S. and Canadian activities in co-operation with the branches and regions of the Ministry and other Ontario government ministries and agencies.

Acidic Precipitation

Co-ordinator: E. W. Piché

Since 1979, when the Acidic Precipitation in Ontario Study (APIOS) was established to investigate acid rain and the long range transport of air pollutants, an extensive multi-disciplinary program has been developed to investigate cause/effect relationships and to explore possible options for abatement. During the fiscal year more than \$8 million was spent on this program, which is carried out in several branches of the

Ministry under the co-ordination of the APIOS office.

In 1982/83, the statistical model, previously developed by Ministry scientists to estimate total deposition of sulphur throughout the province, was expanded to include oxides of nitrogen (NO_x).

The monthly and event deposition monitoring networks continued to monitor wet and dry deposition, airborne particulate matter and gaseous sulphur and nitrogen. While the monthly or cumulative network will help determine acid loadings in various areas, the daily event network will aid in defining more accurately specific source/receptor relationships.

Aquatic, terrestrial and socio-economic studies continued throughout the year, gathering data on which abatement policies can be based.

Much of this research work is conducted at and around the Ministry's research centre at Dorset, Haliburton County, located in the centre of one of the province's most sensitive areas.

This centre is located at the heart of 32 watersheds, including eight lakes, calibrated by APIOS. During the year, staff took thousands of samples of soil, water, rain and snow and measured them for their pH value and other chemical and physical properties.

Ontario has also taken major steps to reduce its own contribution to the acid rain problem.

In August 1980, the Ministry issued a regulation to Inco Limited in Sudbury limiting its SO_2 emissions to 2,500 tons per day, effective the date of the regulation, and to 1,950 per day by December 31, 1982. These reductions were accomplished on schedule.

In February 1981, the Ministry issued a regulation for the reduction of sulphur dioxide and nitrogen oxide emissions from Ontario Hydro's thermal electric stations. Essentially, this regulation will result in a 43 per cent reduction in emissions by 1990.

Regulations and/or control orders for other sources of SO_2 and NO_x are under review.

Ontario has been working closely with the federal government and other provincial governments, as well as with scientists in other nations, to examine the problem and to propose various abatement strategies.

However, without a commitment from the United States, Ontario cannot win the fight against acid rain. For this reason, the Ministry has been involved in a series of legal interventions in the United States, which commenced in March 1981 in proceedings before the United States courts and the Environmental Protection Agency.

On June 30, 1982, the province intervened at a public hearing of the Michigan Air Pollution Control Commission in opposition to the Detroit Edison request to delay bringing its Monroe power plant into compliance with the Michigan "1% or equivalent sulphur in fuel rule". Ontario was represented at the July 20, 1982 meeting where the commission decided not to grant the request. At its November 29, 1982 meeting, the commission considered a 1.9% sulphur in fuel limit for the Monroe plant. Again, Ontario submitted a statement recommending compliance with the 1% sulphur in fuel rule. The commission ultimately rejected the 1.9% option as well.

In February 1983, Ontario submitted a letter to the Indiana Air Pollution Control Board in opposition to a proposed sulphur dioxide emissions limit increase from 6 lbs. of SO_2 /MMBTU to 7.11 lbs. for the Indianapolis Power and Light generating station in Pike County. The control board approved the company's request but has not yet officially submitted it to the U.S. Environmental Protection Agency as a State Implementation Plan (SIP).

To ensure timely intervention in SIP relaxations of concern, the Ministry has asked Canadian consulates in the U.S. for early notification of proposed relaxations.

Legal Services Branch staff, in conjunction with the staff of several U.S. legal firms, as well as staff of the Ontario Attorney General's Ministry, are reviewing various legal avenues open to the province in the U.S., including:

- Continued interventions at the state level under Section 110 (State Implementation Plan Revisions) of the U.S. Clean Air Act.
- Possible legal suits under Sections 126 and 115 of the U.S. Clean Air Act.

Niagara River Improvement Program

Co-ordinator: P.J. Crabtree

In order to better concentrate Ontario's efforts to reduce the discharge of contaminants to the Niagara River from Canadian and United States sources, and to stimulate corrective action, the Niagara River Improvement Team was formed in November 1981.

In Ontario, the team has been re-evaluating the quality of effluents from industrial and municipal sources that discharge into the Niagara and Welland rivers, in terms of the toxic organics and metals they may contain. In addition, surface and subsurface waters adjacent to landfill sites have been sampled and analyzed. The results of this work, and recommendations for further appropriate control programs, are expected to be published in the fall of 1984.

The team is also looking closely at all significant sources of pollution on the New York State side of the Niagara River.

Reviews are being conducted of State Pollution Discharge Elimination System permits for major industrial and municipal discharges that contribute about 95 per cent of the point source contamination from the U.S. side. Following these reviews, the team submits comments and suggestions for changes to the New York State Department of Environmental Conservation. If the team considers that a public airing of the issues and concerns related to a particular permit is needed, it may ask for a hearing.

The team evaluates waste disposal sites in New York that pose major threats to the Niagara River. These include the Love Canal, Hyatt Park, S-Area, 102 Street and Occidental Petroleum's Niagara property, all of which are the subject of litigation in state or federal court. In each case, the team's first step is to carry out a technical evaluation. Subsequent action depends on the situation, and varies from monitoring remedial work to seeking intervention status in court proceedings.

In addition to the inactive waste disposal sites, the team reviews ap

tions for new landfill facilities. In particular, the team has looked at proposals by the SCA Company for expansion of its operations at Model City, and has expressed its views at several public hearings.

The team is represented on the International Niagara River Toxics Committee, which comprises scientists and engineers representing federal, state and provincial environmental agencies in the U.S. and Canada. Its terms of reference are to identify the sources and chemical nature of all outputs of contaminants to the river, and attempt to quantify individual chemical substances.

The committee will also make recommendations for control programs beyond those already in place, and for a long-term monitoring program for the river. It will be reporting in the fall of 1984.

Emergency Response Co-ordination Office

Co-ordinator: G. H. Kay

The Ministry's primary role in spill incidents is that of a regulatory body enforcing the provisions of the Environmental Protection Act.

The Emergency Response Co-ordination Office maintains and updates the Province of Ontario Contingency Plan for Spills of Oil and Other Hazardous Materials.

In 1982/83, staff of this office:

- Assessed the Ministry's role and preparedness for spills and other emergencies.
- Prepared the 1982 spill reports summary.
- Revised and updated the Ontario contingency plan.
- Worked with other ministries on the Transportation of Dangerous Goods Act and regulations and the Emergency Plans Act.
- Continued development of Part IX of the act and regulations.
- Assisted in efforts to provide a field communications system serving the province.

- Produced training aids.
- Processed reports from regional staff on 482 spills
- Worked with governments and industry on contingency planning and response.
- Participated in the Associate Deputy Minister's review of the Ministry's Emergency Response capability.

Blueprint for Waste Management

Co-ordinator: T. D. Armstrong

In November 1982, the Hon. Keith Norton announced the preparation of a discussion paper entitled "Blueprint for Waste Management" to be prepared by June 1983. He invited the public to submit ideas for improving waste management in Ontario. Numerous and varied public contacts were made as the Blueprint was prepared. Municipalities, industries, interest groups and individuals were involved.

Also in late 1982, six people were assigned to compile a field inventory of approximately 1,400 certified active waste disposal sites, reviewing each on the basis of a standardized format. By the end of the fiscal year, most of the waste sites in Southern Ontario had been inspected.

environmental planning division

Assistant Deputy Minister:
D. E. Redgrave

This division is responsible for developing plans, programs and policies; to provide technical and scientific expertise and support to Regional Operations in the conduct of field monitoring site investigation and prosecutions; to protect air quality; to protect surface and ground water quality and quantity; to manage wastes; to ensure an adequate quality of drinking water; and to promote the consideration of the environment in the planning and the development of undertakings.

The Division consists of:
Air Resources Branch
Water Resources Branch
Waste Management Branch
Hazardous Contaminants and Standards Branch
Environmental Assessment Branch
Laboratory Services and Applied Research

Air Resources Branch

Director: G. Van Volkenburgh

This branch develops all proposed policies, programs, standards, guidelines, legislation and regulations for the protection and enhancement of ambient air quality in the province.

It provides support and advisory service to the Ministry for emission control as well as other ministries, agencies and the public.

Air Quality and Meteorology Section

This section maintains the data base and telemetering system of Ontario's air quality monitoring network, which in 1982/83 constituted 1,250 instruments located in 125 areas.

The network produced approximately 3 million measurements, which are computer-processed. The measurements consist of the levels of 12 contaminants as well as meteorological parameters.

The section also develops and applies mathematical models to compute the quality of air and dry and wet deposition (acidic precipitation) of contaminants.

The contracted development of a complex acid deposition and oxidant air-monitoring model, sponsored by the Ministry in partnership with Environment Canada and the West German Government, is reviewed by this Section.

The Ontario Air Pollution Index, the basis for the Ontario Alert System, continued to be monitored and publicized daily for Windsor, Sarnia, Hamilton, Niagara Falls, Toronto, Sudbury, Coniston, New Sudbury and St. Catharines.

Atmospheric Research and Special Programs

The monitoring and instrumentation development unit monitors air quality in special surveys and during emergency response procedures using mobile facilities. It also develops and evaluates instrumentation to measure concentrations of non-routine air pollutants, especially organic vapors.

The special studies unit is responsible for the co-ordination of activities under the Nanticoke Environmental Management Program and for carrying out the atmospheric chemistry and deposition (wet and dry) monitoring program for the Acidic Precipitation in Ontario Study.

The atmospheric contaminants and research planning unit co-ordinates branch activities related to hazardous contaminants and contributes to the development of a priority list of hazardous chemicals and a handbook of environmental contaminants. This unit has also been active in the evaluation of measurement methods for inhalable particulate matter, organic vapors, and polynuclear aromatic hydrocarbons. The unit administers the air research working group which plans and recommends internal and external research projects related to air pollution. This includes funding to Ontario universities.

Emission Technology and Regulations Development Section

This section is composed of four units — regulations development and environmental assessment, control and process technology, source testing and vehicle emissions.

Regulations Development and Environmental Assessment Unit

During the year, the unit established five guidelines for new air contaminants and issued comments on air quality in 10 environmental assessments. Staff played a major

Extensive Air Monitoring Surveys, 1982/83

Compounds	Locations	Source
Organic compounds	Mississauga	St. Lawrence Cement
Sulphur dioxide	Sudbury	Falconbridge Nickel Mines Ltd.
Organic compounds	Elmira	Uniroyal Ltd.
Odors	Toronto	Meat packing plants
Odors	Toronto	Continental Can
Sulphur dioxide Reduced sulphur compounds, Hydrocarbons	Breslau	Breslube Enterprises
Fluoride and odors	Dunnville	International Minerals and Chemical Corporation
Organic compounds	Simcoe	Canada Wire and Cable
Reduced sulphur compounds and hydrocarbons	Nanticoke	Stelco
Reduced sulphur compounds, Particulate, chlorine and chlorine dioxide, hydrocarbons	Fort Frances	Boise Cascade Canada Ltd.
Organic compounds and ammonia	Sault Ste. Marie	Domtar
Sulphur dioxide	Toronto	Anacheia Ltd.
Hydrocarbons and chlorinated hydrocarbons	Woodstock	Cement Lafarge
Phenol	Cambridge	Becher Lay Tech
Organic compounds	Toronto	Signode

le in preparing the Ministry submission and participation at the public hearing regarding the proposed energy-from-waste installation at Victoria Hospital, London.

Staff also assisted in the development of Ontario's position concerning the federal proposal for the reduction of standards for new-car emissions of carbon monoxide, total hydrocarbons and nitrogen oxides.

Standard methods for the sampling and analysis of 14 compounds in ambient air were developed.

Staff developed a new impulse vibration standard for regulating vibration complaints, and revised 11 technical publications supporting the Model Municipal Noise Control bylaw.

In Ontario, 125 municipalities have now adopted a noise control bylaw under Section 138 of the Environmental Protection Act. Twenty applications for certificates of approval and 17 environmental assessment documents were reviewed for potential noise impact. Staff provided testimony or consulting services at four Ontario Municipal Board hearings and in four legal actions.

In co-operation with land-use planning assessment unit, staff investigated 170 noise and vibration complaints.

Eight seminars and courses in acoustic technology for 140 participants were given to municipal and provincial government staffs. Staff also participated in the work of research advisory committees at provincial and federal levels, and in the work of standard writing bodies such as the Canadian Standards Association, International Organization for Standardization, and International Electrotechnical Commission.

Vehicle Emissions Unit

During the year, 5,036 cars in 1,000 locations were checked for emission controls and exhaust emission levels. Of these, 52 per cent failed to meet Ontario standards and their operators were requested to have the problems corrected. Ten per cent had pollution control equipment inoperative or disconnected and were issued violation notices.

A total of 3,084 cars were inspected at 317 used-car dealerships and 124 violation notices were issued. Visits were made to 425 muffler shops to ensure proper replacement of catalytic mufflers. Also, 785 gas stations were checked to ensure that leaded gasoline is not dispensed to catalyst-equipped vehicles. Incorrect dispensing nozzles were noticed in 151 stations.

Highway patrols in co-operation with the Ontario Provincial Police have been continued and resulted in 422 diesel trucks being stopped for excessive smoke emissions: 386 charges were issued and 36 warnings; 370 operators were found guilty and fined, 12 cases were dismissed and four are pending.

Staff made 30 visits to community colleges to explain Ministry control programs and provisions of the Environmental Protection Act to 2,520 student mechanics.

Source Measurement Unit

The unit continued acting as a project co-ordinator for the Ministry's program on dioxin emissions from combustion sources. In 1982/83 measurements at three municipal incinerators were completed, a provisional guideline on air concentrations of dioxins and furans was issued and emissions from the measured incinerators were assessed in terms of the guideline provisions.

Staff also initiated work on construction of an emissions monitoring van, co-ordinated source testing at the Texaco refinery in Nanticoke and oversaw compliance source testing programs.

Control and Process Technology Unit

The unit participated in developing the Ontario/Canada Task Force report on the non-ferrous smelting industry, evaluating consultants' studies and cost surveys, and reviewing drafts of the report.

A survey was conducted of Ontario petroleum refineries in order to assess their potential for reducing emissions of sulphur dioxide, and the costs involved. In addition, the ability

of the refineries to reduce the sulphur content of fuel oils was examined in connection with the possible need for curtailing emissions of sulphur dioxide from smaller combustion sources.

The unit also continued to provide information on emission control technologies to various branches and programs of the Ministry.

Phytotoxicology Section

The section conducted soil and vegetation assessment studies near 94 industrial and other sources and investigated 181 vegetation complaints in which air pollution was suspected of causing damage.

Twenty-nine per cent of the 181 complaints investigated were diagnosed as being caused by contaminants and 38 involved possible economic losses, with reports provided to the board of negotiation in the event claims of damage were made.

During the 1982 crop-growing season phytotoxicology staff conducted extensive field assessment surveys to determine the degree of ozone injury on white-bean, potato and tomato crops throughout south-western Ontario. Oxidant injury to crops was about the same as found in 1981, with 1981 and 1982 ratings being well below the highest rating found during 1976.

More than 30 complaints about suspected lead contamination of garden soil and vegetables in the vicinity of a secondary lead smelter were investigated in 1982. In all cases, concentrations were well below the level at which soil replacement was recommended.

Mercury levels in vegetables were found to be excessive in both 1981 and 1982 on properties downwind of a chloralkali plant in Cornwall. An experiment is under way to assess the pathway of mercury into the vegetables, either from contaminated soil or company emissions.

Surveys continued on Cornwall Island to document the degree of fluoride injury to vegetation resulting from emissions from aluminum smelters in New York State on the south side of the St. Lawrence River. There has been a significant reduction in the amount of damage on Cornwall Island compared to the

early 1970s as a result of abatement actions by the companies. However, some effects occur annually with little change having been noted in 1982 compared to the previous year. The phytotoxicology data will be used in a lawsuit initiated by the St. Regis Indian Band.

Experiments were conducted in 1982 at the Ministry's controlled environment facility at Brampton. A study was conducted to determine if contaminated soil from Fighting Island, near Windsor, could be treated to support vegetation. The addition of peat moss plus fertilizer was found to promote satisfactory growth of grasses on the chalky spoil material composed principally of gypsum and lime.

A mobile overhead canopy system is being built to study the effects of acid rain on field-grown crops.

Water Resources Branch

Director: D. N. Jeffs

As part of the Ministry's reorganization, the municipal and private section of the disbanded Pollution Control Branch was transferred to the Water Resources Branch. A first priority of this unit will be to review and update existing drinking water objectives.

Water Management

Working Group I (Water Quality Objectives and Criteria) of the water management steering committee was reorganized. As its first task, the group developed a procedure for adding to or revising the provincial water quality objectives. Chlorophenols and chlorobenzenes were reviewed and proposed objectives were developed for each of the constituents of these groups. Peer reviews of the findings were initiated in the spring of 1983.

Staff continued to co-ordinate and participate in the activities of several Ministry committees and working groups, such as the water management steering committee, the groundwater liaison committee, the landfill gas committee, the Maple (Keele Valley) landfill committee, the technical steering committee — Uniroyal Site, Elmira, the Salford landfill committee and the waste management site support team.

Staff participated in inter-agency liaison activities, including the Canada-Ontario hydrometric cost-share agreement co-ordinating committee, the erosion and sedimentation committee, the Canadian advisory committee on remote sensing and the nonpoint source control task force of the International Joint Commission.

During the year, 459 water well drilling and boring licences were issued and 20 contractors licenced for the first time. Prosecutions against three drillers on seven charges were successful. Renewal of one licence was refused and this refusal was upheld at a hearing of the Environmental Appeal Board. A total of 7,341 water-well records were received and processed.

As part of a provincial ground water quality network, intensive monthly sampling began at 26 well sites to monitor background groundwater quality conditions and to identify the nature of quality fluctuations and long-term trends. As well, planning was initiated on the development of a specific groundwater network to monitor and identify trends in background levels of trace contaminants in groundwater.

Water Resource Inventories

A report on the water resources of the Holland and Black river basins was published. Results from a water resources inventory of the upper portions of the Etobicoke Creek, Mimico Creek, Humber River and Don River basins were assembled for publication. Field work and data compilation were completed for the Credit River basin study.

Water resources data (1981) for streamflow, water quality and observation well monitoring networks were assembled for publication. Ground-

water well information obtained from licensed drilling and boring contractors was released in two publications in the groundwater series. Reports on groundwater quality fluctuations and streamflow variability in agricultural lands were published.

A biological monitoring component was added to the provincial water quality monitoring network to investigate inorganic and organic trace contaminant levels in young-of-the-year fish.

The groundwater mapping program continued with the publication of two groundwater probability maps and the completion of data assessment and/or cartography for an additional three. Five groundwater susceptibility maps were published and data compilation was completed for an additional 14.

Engineering, Scientific and Data Services

Geophysical surveys involving seismic, resistivity, gravity, well logging and magnetometer techniques were undertaken to assist in the investigation of several groundwater contamination problems, groundwater development projects, hydrogeological investigations for waste disposal sites and the location of buried metal containers.

Groundwater surveys and general reviews of groundwater potential were undertaken for eight municipalities. Ten test-drilling and well construction projects to develop municipal water supplies were supervised. Groundwater interference problems were investigated for four municipal projects. Technical assistance was provided for five private services funding projects.

Reviews of groundwater contamination potential were undertaken for 18 landfill and waste sites. Staff completed a review and prepared a detailed submission for the Environmental Appeal Board on York Sanitation Landfill No. 4. Extensive assistance on this subject was provided to the Legal Services Branch, the Environmental Approval Branch, the Environmental Hearing Board, and the Project Engineering Branch. Staff reviewed hydrogeological evidence presented at the consolidated hearing board for the Oxford County landfill site and prepared a submission to Cabinet.

Great Lakes (tributaries) Program

Total phosphorus loading estimates (1981/82) for significant tributaries in the Canadian Great Lakes drainage basin were provided for the 1982 Water Quality Board report of the International Joint Commission. Enhanced monitoring at 7 significant Great Lakes tributaries was initiated to improve the precision of tributary loading estimates.

Hazardous Contaminants and Sport Fish

The Water Resources Branch, through its Hazardous Contaminants Unit continued its information series on potential organic and inorganic pollutants. Environment and health data, such as physical/chemical properties, aquatic environmental pathways and fate, and toxicity, are routinely circulated to Ministry staff dealing with the aquatic environment. Individual technical assistance is also provided for specific investigations at the request of regional and head office staff.

The Hazardous Contaminants Unit co-ordinates the sport fish collection and testing program, a co-operative effort between this branch and the Laboratory Services and Applied Research Branch, and the Ministry of Natural Resources. Fish from lakes and rivers throughout Ontario are tested for a variety of organic and inorganic substances including mercury, PCB, mirex, DDT and 2,3,7,8-TCDD (dioxin).

The fifth annual edition of Guide to Eating Ontario Sport Fish was published with a substantially revised format with a new section on dioxin and a fish identification chart. Information on fish species from 1,100 locations was set forth to assist anglers in determining the suitability of eating the fish that they caught. The new or updated information was published in five environmental health bulletins.

Lakeshore Capacity Study

The summary report was completed for the Lakeshore capacity study trophic status component. This

project was designed to aid in assessment of the effects of current and future proposals for shoreline development of Ontario's recreational lakes. Research studies were carried out, over the period 1976/1980, on lakes and streams selected to exhibit a range of development and trophic status. Studies of many of these lakes and streams are continuing under the APIOS program. Effects of development on the study lakes were evaluated and a step-by-step method was developed for predicting development effects on lake trophic status.

Grand River Study

The final report of the Grand River basin water management study was released and was followed by a series of public meetings. Through a questionnaire, basin municipalities were encouraged to provide their reaction to the report's recommendations. In general, reaction was favorable. The results will be presented to the Provincial Government.

Sudbury Environmental Study

The final limnological report on studies of seven acidic lakes in the Sudbury area was completed. The program spanned 1973 to 1980 and included investigations of atmospheric and watershed inputs to the lakes, lake chemistry, biota and sediments. Experimental neutralization and fertilization of lakes were carried out. Mass balance models, using the chemical data, demonstrated that 50 to 85 per cent of the total deposition (dependent on distance from smelting operations) was the result of dry deposition of sulphur dioxide which is largely of local origin. Acidification rates of the experimentally treated lakes were also calculated. Effective treatment was as short as two years and depended on the rate of supply of strong acid to the lakes.

Acidic Precipitation in Ontario Study (APIOS)

Staff continued intensive sampling and analysis of the eight major study lakes near Dorset and their 31 associated sub-watersheds. The intent is to quantify the physical, chemical and biological effects of acidic inputs to lakes and eventually to construct models enabling prediction of both effects and acceptable loading rates of acid-forming materials. Methods to determine the speciation of aluminum in water were developed and applied in conjunction with pH toxicity testing of fish and amphibians.

International involvement in acidic precipitation research was continued. Presentations of the Ministry's results were made at the 10-year anniversary Man and Environment conference in Stockholm. Staff took part in the evaluation of research investigative programs in the U.S. Dr. J. Galloway, an atmospheric deposition expert, spent part of the year working with APIOS, and numerous specialists from across Canada and the U.S. have done studies over the year with Dorset Research Centre personnel.

An inventory of 135 private, domestic groundwater supplies between North Bay and Timmins was completed, and an inventory of the effects of acidic lake waters on domestic plumbing systems in the Sudbury area was started. Groundwater quantity and quality studies in the APIOS calibrated watersheds near Dorset continued with extensive sampling of groundwaters and the installation of piezometers and observation wells.

Two progress reports on groundwater quality studies on domestic drinking waters in the Muskoka/Haliburton and Sudbury areas were published.

Stratford-Avon River Environmental Management Project

In this three-year study, information was assembled on water quality, aquatic plants and algae, hydrology and pollutant loadings from sewage treatment plants, industrial discharges and agricultural areas. Demonstration projects of remedial measures were initiated in-stream and in the urban and rural areas.

Forty-two technical reports were prepared. The final report is under review.

Toronto Area Watershed Management Strategy Study

Activities relating to the Toronto area watershed management strategy study began in 1981. The Ministry is conducting the project in co-operation with the Metropolitan Toronto and Region Conservation Authority, Metropolitan Toronto and the cities and boroughs within Metropolitan Toronto. During the first year, staff compiled existing sources of data on water quality and pollution control systems and collected additional data needed to fill major gaps in the data base. Staff are currently involved in the third year of the study, with emphasis on the Humber River.

Lake Simcoe Environmental Management Strategy Study

These studies conducted by the Ministry and the South Lake Simcoe Conservation Authority continued for the second year. Activities related primarily to identifying the sources of diffuse phosphorus loadings, their magnitude and significance, and investigating methods of reducing them. Construction of the water monitoring stations was completed and nutrients and flow data were collected on streams flowing into Lake Simcoe. Treatability studies on pump-off waters from the Holland Marsh were conducted and rating curves developed for the pumping stations. Agricultural land use data

were compiled and studies initiated to prepare erosion sensitivity mapping of the Lake Simcoe basin.

The Lake Simcoe monitoring program was continued and a special study was conducted on phosphorus regeneration in the lower Holland River.

Water Supply and Pollution Control

The fourth revised edition of the Ontario drinking water objectives and the accompanying policy statement were completed. The revised objectives, subsequently approved and put into effect in April 1983, become the primary document governing the management of drinking water quality in Ontario. More criteria, particularly on hazardous contaminants, are being set as part of an ongoing program. A comprehensive sampling program to monitor and assess plant compliance with the drinking water objectives on a provincial basis is under development.

An information package on fluoridation was prepared in co-operation with representatives from medical officers of health, Ministry of Health and the Canadian Dental Association. The information package was sent to medical officers of health and waterworks authorities with controlled fluoridation programs. During a period of fluoridation chemical shortages, staff provided advice on matters dealing with fluoridation interruption.

Staff continued to serve on committees and panels, made presentations and informed news media about subjects related to maintenance of safe drinking water. Special activities included the evaluation of piping materials and 17 commercial products for acceptance and use as treatment chemicals, paints, coatings or linings in contact with potable water.

Assistance was given to local public health agencies in organizing their survey of public bathing beaches. Advice was also provided on private water supply problems.

Guidelines on selection and location of cemetery sites for the protection of water supply sources were completed and published for distribution to regional offices and

public health units. Staff conducted health unit seminars on private water and bathing beaches and assisted in the planning of a seminar on environmental health aspects of spills for the Ontario Public Health Association.

Assistance was also provided to the regions and local health units on the acceptability of particular home water treatment devices.

In the area of municipal wastewater control, policies and guidelines have been developed and implemented to specify effluent requirements and to facilitate their incorporation into certificates of approval for municipal and private sewage works where appropriate. Implementation of these policies and guidelines tightens the control of municipal and private sewage works discharges.

To expedite the implementation of the effluent compliance enforcement program, TUMMIS (Total Utilization Monitoring and Management Information System) has been developed and is now operational. This system will store effluent data for wastewater facilities, and automatically assess the plants' compliance with specified effluent requirements.

Monitoring and evaluation of phosphorus removal at wastewater treatment plants was continued. In 1982, 241 wastewater treatment plants with phosphorus removal facilities removed an estimated 8,500 tonnes of phosphorus which would otherwise have been discharged to lakes and rivers.

A status report on the pollution abatement efforts of Great Lakes municipalities in Ontario was forwarded to the International Joint Commission for inclusion in the IJC Water Quality Board annual report.

Development of the Ontario urban drainage management program, co-ordinated by the municipal sewage unit, has moved into the final phase. The intergovernmental urban drainage policy implementation committee (consisting of representatives from the ministries of the Environment, Municipal Affairs and Housing, Natural Resources, and Transportation and Communications, and from the Municipal Engineers Association and the conservation authorities) has completed a draft policy and guidelines implementation package. Its implementation will ensure quality and quality control of urban

drainage where necessary, and in the most cost-effective and consistent manner.

In addition to co-ordinating federal/provincial efforts in determining sewage treatment process efficiencies in removal of selected hazardous contaminants, as well as in characterization of sewage treatment plant effluents and urban runoff, staff also initiated an industrial sewer-use control review program aimed at improving the capabilities of municipalities when dealing with hazardous contaminant discharges.

Great Lakes Section Program

The Great Lakes program is a federal/provincial cost-shared surveillance, investigation and assessment program providing data and information required for defining aquatic environmental conditions and trends in nearshore areas and connecting channels of the Great Lakes. It determines the effectiveness of pollution abatement measures necessary to restore and maintain water quality in accordance with provincial water quality objectives and the objectives of the Canada/U.S. Agreement of 1978.

Ministry surveillance programs, along with the programs of other environmental and regulatory agencies around the Great Lakes, are rapidly adding to our knowledge of the distribution of many contaminants such as heavy metals, pesticides, herbicides, organochlorines, and other hazardous organic contaminants. The following are the highlights of the Ministry's surveillance activities in 1982/83 on a lake-by-lake basis.

Lake Superior

The water quality of Lake Superior, including the nearshore areas, is generally satisfactory and the lake can be considered to be oligotrophic. Problems, where they exist, are confined to areas near large urban centres and industrial operations related to pulp and paper mills. Surveillance work in 1982/83 concentrated on extending the 1981/82 pulp and paper mill inves-

tigations to other areas, as a further preliminary assessment of water quality conditions in nearshore areas. These assessments also provided the background for the development of more intensive studies of Lake Superior as part of Great Lakes international surveillance plan for 1983/84.

Specifically, studies in Jackfish Bay in 1981 provided information on guidelines for toxic contaminants for use in a control order issued in 1982 for the Kimberly-Clark mill. An assessment of water quality in Thunder Bay and the characterization of effluents from seven mills discharging to Thunder Bay, Nipigon Bay, Jackfish Bay and Lake Superior, provided a baseline for future evaluation of the aquatic environment in nearshore areas. In addition, an inventory of trace contaminant constituents of pulp and paper mill effluents was established for use in formulating effluent guidelines and issuance of control orders.

Lake Huron

The water quality in Lake Huron is satisfactory with the exception of isolated nearshore areas of Saginaw Bay on the U.S. side. The lake can be considered to be oligotrophic. On the Canadian side, problem areas are confined to the St. Marys River and certain harbors and embayments such as Penetang and Midland. Analysis and reporting of activities of the 1980/81 Lake Huron intensive year study was continued.

Monitoring of the impact of the Great Lakes Power Ltd. redevelopment project on St. Marys River water quality was continued. No adverse effects have resulted. The studies provided information relevant to the need for further remedial measures at Algoma Steel Ltd. and at the Abitibi-Price paper mill. A control order was issued to Algoma Steel to limit discharges of phenol, ammonia, cyanide and hydrogen sulphide which in turn should eliminate transboundary pollution in the St. Marys River.

Investigations for the proposed westerly sewage treatment plant for the City of Sault Ste. Marie were initiated.

Lake Erie

Because Lake Erie has the smallest volume of all the Great Lakes and the largest population around it, water is susceptible to the effects of nutrient enrichment.

Studies focused on the distribution of nutrients and algae in the western basin and the establishment of a baseline for the Grand River mouth area to assess the impact of future development in the Grand River watershed. Total phosphorus levels along the Ontario shoreline of the western basin were well within the Ministry's guideline (20 ug/L), indicating a significant decline during the last decade. The study to determine the impact of industrial development at Nanticoke was continued and reports for the period 1969/1978 were drafted.

Studies were initiated in the St. Clair River to determine the effectiveness of remedial measures undertaken at industrial sources in the Sarnia area to reduce phenols and organics. Total phenol levels in 1982 were generally in compliance with the provincial objective. In addition, the extension of the Township Ditch should alleviate the impact on nearshore waters and will eliminate the overlap of phenols from multiple sources along the shore.

Bacteriological studies along the Ontario shoreline of the Detroit River indicate levels above the Ministry's objective for recreational uses. Several remedial measures, which included sewer separation and the expansion of the Little River and Windsor sewage treatment plants, were started as a result. Studies are under way to expand the Amherstburg sewage treatment plant.

Lake Ontario

The presence of various toxic contaminants can be considered to be the major concern of recent environmental studies. The major source of these contaminants is the Niagara River and its numerous dump sites and chemical facilities on the United States side. Studies and investigations on the Niagara River, including assessment of industrial and municipal discharges on water quality and biota, were the most important part of the

enhanced monitoring of Lake Ontario in accordance with the Great Lakes international surveillance plan.

As a result of these investigations, recommendations were forwarded to the New York State Department of Environmental Conservation regarding U.S. permits to limit discharges of trace organics in the Niagara River. The impacts of the United States and Canadian sources were elaborated and confirmed and provincial input was provided to the international Niagara River Toxics Committee studying the Niagara River.

Since the largest concentration of population on the Canadian side of the Lake Ontario basin is at the western end, special studies on the effects of Hamilton Harbor outflows on the nearshore area were continued and trace contaminants loadings from municipal and industrial discharges were assessed.

Studies on the Toronto waterfront continued. This included updating and continued assessment of the effects of Keating Channel dredging and lake filling at Eastern Headland which revealed no impact on the safety of drinking water. Surveys were carried out to identify the extent of sediment movement from the headland.

The sources of bacteriological contamination of beaches at St. Catharines were investigated and the program of providing information on the bacteriological levels at beaches along the Toronto waterfront was continued.

Similarly, monitoring of bacteriological water quality at Cardinal (Iroquois/Morrisburg) was carried out to assess the impact of sewage treatment plant effluents on local water use.

Waste Management Branch

Director: R. M. Gotts

The branch is responsible for the development and recommendation of policies, programs, guidelines, legislation and regulations required for comprehensive waste management programs for hauled liquid industrial and hazardous wastes and municipal solid waste.

In conjunction with these activities the branch also promotes the conservation, recovery and utilization of material and energy resources from wastes and provides an advisory service to the public and to those managing the waste.

Municipal Waste Management

Experimental Plant for Resource Recovery

The plant was in full operation throughout the year. In June 1982, receipts of municipal solid waste increased with the closing of the Dufferin incinerator operated by Metropolitan Toronto.

Marketing Development – Waste Derived Products

Market development activities for products of the experimental plant and resources recovered from wastes continued.

Based on promising results of the first stage of its investigation of the use of refuse derived fuel as a fuel in clay brick manufacture, the Brampton Brick Company, with Ministry funding, initiated preliminary work on the second stage leading to a plant-scale trial. The trial will be undertaken during 1983/84.

Compost from the plant continued to be provided for demonstration trials and for sale. Results from a demonstration study

at Ridgetown College of Agricultural Technology confirmed the previous year's results that compost must be properly cured prior to use. Sales of compost during the year increased and demand continued to grow. Demand approached the plant's capacity and it is anticipated that it will exceed supply capability next year. Principal users include parks, conservation authorities, the horticultural industry, and garden centres.

Source Separation

Project Paper Recycling is in its fourth year of operation. Approximately 14,000 government employees in more than 50 buildings in the Toronto area are involved in the office fine paper recovery project.

Project Paper Recycling had a gross revenue of \$24,000 for 1982, and removed 195 tonnes of saleable paper from the solid waste stream.

Based on Ministry experience and efforts to expand such activities beyond the provincial government, 11 municipal governments have initiated similar projects with Ministry-supplied hardware and technical advice. Hardware has also been supplied through recycling organizations and private companies to recover fine paper from 20 private sector offices.

Source Separation Grant Program

The incentive program for source separation, which started in August 1981, provides financial and other assistance for the development or expansion of municipal-scale multi-material source separation projects. Such assistance, totalling \$330,000, was provided to six organizations or private companies operating municipal-scale source separation projects and to two companies operating fine paper recovery projects. This is an increase from the three companies receiving assistance during the first year of the program. Projects receiving Ministry assistance serve 1 municipalities and during 1982/83 resulted in the recovery of 8,000 to of material.

Waste Management Studies

The Ministry offers a 50 per cent subsidy to groups of municipalities to encourage them to undertake long-term planning studies for waste management.

During 1982/83, 10 studies were active, seven were completed and two were initiated.

Waste Management Improvement Program

Under this program, which began in 1977, funds are provided to municipalities for upgrading and closing sites and remedial activities.

The budget for the 1982/1983 program was \$700,000, comprising an initial \$500,000 which was augmented by an Ontario employment-producing initiative of \$200,000. The additional allocation generated 157 jobs for a period of two to eight weeks.

Other results included 21 site closings, the upgrading of 72 sites, completion of 24 site studies and site clean-up and other remedial activities at 29 locations.

Special Landfill Studies

Gas Migration Study:

The branch-funded three-year study of migration patterns of landfill-generated gas was completed. This will provide the basis of guidelines to control development of lands adjacent to and on waste disposal sites. The consultant engaged for the study investigated nine sites selected because of specific conditions affecting migration, such as soil type and climatic conditions.

Utilization and Control of Landfill Gas

Landfill-generated gas from the Kitchener landfill site was proposed for use in industrial boilers located at West Pipe Ltd. in Kitchener. The design and implementation was conducted by Conestoga Rovers Ltd.

of Waterloo. The project was funded by the Regional Municipality of Waterloo, the Ministry of Energy, and the Federal Government. Because it was proposed to use the gas extraction system as a control system for migrating gases to adjacent development, the Ministry also had the consultant conduct research on the effectiveness of the extraction system.

Carbonated Soft Drink Container Legislation

The Ministry undertook a major review of carbonated soft drink container legislation. A discussion paper outlining the nature of the problem and options for resolution was circulated for comment. Comments are being analyzed and a recommended course of action developed.

Sewage Sludge Utilization Program

Implementation of guidelines for the beneficial use of sludge on agricultural lands was completed. This program is carried out in co-operation with the Ministry of Agriculture and Food.

Blueprint for Waste Management – Municipal

The Ministry began a review of the Ontario waste management program. The objective was to produce a discussion paper, Blueprint for Waste Management, which would receive wide circulation and invite comment before putting into place a course of action. The branch directed much of its resources to drafting the document and its appendices which address virtually all aspects of waste management and lay the foundation for future initiatives.

Industrial Waste Management

Radioactivity

The Ministry takes an active role

in monitoring and protecting the environment from concentrations of radioactive contaminants.

Staff continued to review data on the concentration of radionuclides in air and water and to provide a radiation consulting service for other branches and the regions.

Staff worked closely with the radiation protection laboratory of the Ministry of Labour on sources of natural radioactivity in Northern Ontario, and on sources of low-level radioactive wastes, such as old radium dial painting factories in Toronto.

PCB Handling and Disposal

A regulation (O.Reg 11/82) has been implemented to enable owners meeting certain preconditions to establish PCB waste sites on their own property pending the implementation of a provincially-approved PCB destruction facility.

The Ministry is monitoring the commercial development and potential application of several PCB destructive processes. These include the diesel engine (D&D, Smithville) for askarel, sodium reduction processes (Sunohio's PCBX) for low-level PCB contamination of mineral oil, and other techniques.

A number of mobile technologies have been developed which are capable of meeting the technical requirements for the destruction of PCB. Facilities based on these technologies offer an acceptable alternative to communities which may oppose the establishment of permanent, large-scale waste destruction facilities. Mobile facilities also offer the opportunity for communities to deal with hazardous wastes and to reduce waste transportation risks.

The use of mobile destruction facilities suggests the need for a revised regulatory strategy since most of Ontario's environmental legislation is fixed-facility oriented.

In February 1983 the Ministry published a draft guideline for the regulation and siting of mobile PCB destruction facilities in a discussion paper. This paper proposed terms and conditions, technical requirements for technology selection and approval and performance and

operational requirements based on fixed-facility criteria.

The intent of the proposals was the development of a regulation under the Environmental Protection Act which would preclude the necessity for repeated formal hearing procedures for each temporary destruction site, and yet offer an opportunity for public hearings on the proposals and public input to the criteria.

More than 700 copies of the guidelines-discussion paper were distributed to municipalities, public utilities, public interest groups, trade associations, professional associations and other government agencies. Responses to these proposals are under review.

Blueprint for Waste Management — Industrial

The Blueprint for Waste Management will, in addition to addressing municipal waste problems, also respond to problems with the management of hazardous and liquid industrial waste. Key aspects are addressed as follows:

Hazardous Waste Definition

An Interim Guideline for the Interpretation of the Hazardous Waste Definition was prepared and released for technical review. The document provides a comprehensive means to classify wastes into hazardous waste, site-specific waste and liquid industrial waste categories. It provides specific testing criteria and listings of hazardous and site-specific wastes. The guideline is being applied in the field to gain practical working experience. Following the review, the revised definition will be adopted by regulation under the Environmental Protection Act.

Proposed Generator Registration

A proposed generator registration regulation was developed which will require generators of hazardous waste, site-specific waste and liquid industrial

wastes to register with the Ministry. Generators will be required to provide detailed information about the type and nature of the waste, quantities generated, current disposal practices, and in some cases, detailed analytical information. Each generator will be given a company identification number and wastes will be coded. The program will complete the Ministry's effort to have cradle-to-grave management of industrial waste when it is integrated with the expanded waybill system under revised Regulation 313.

Revised Regulation 313, Transfer of Liquid Industrial Wastes

Proposed amendments to Regulation 313 were developed which extend the coverage of the current waybill system. Transfers of hazardous waste and site-specific waste will be included in the waybill requirements, in addition to liquid industrial waste. A new waybill form will be designed to satisfy these additional requirements.

The data processing capability of the Ministry is also being upgraded to address control and monitoring requirements of the system, as well as providing statistical data on the management of these types of waste.

Hazardous Contaminants and Standards Branch

Director: C. J. Macfarlane

The branch provides services and programs relating to the management of hazardous environmental contaminants and of pesticides, including planning, research, co-ordination, development and implementation of policies.

A major function is the co-ordination of the Ministry's program for setting standards on chemicals for the protection of human health and the environment. Another important function is the control of pesticides, including their distribution, sale, storage and use. This is achieved by regulation, and by educating the pesticides industry, applicators, farmers, municipalities and the public on the proper use of pesticides.

Until August 1982, the Ministry's hazardous contaminants program and pesticides management were co-ordinated by the Hazardous Contaminants Office and the Pollution Control Branch respectively. In August, these programs were integrated into the Hazardous Contaminants and Standards Branch.

Industrial Chemicals Section

This section is responsible for assessing the significance of hazardous industrial contaminants, for establishing standards on chemicals, and for co-ordinating activities relating to the control.

During 1982/83, the functions of the former hazardous contaminants co-ordinators committee were assimilated by the hazardous contaminants management committee. This committee, chaired by the manager of the industrial chemicals section, is composed of assistant

directors from relevant Ministry branches. It is responsible for overseeing and recommending to the director of the branch appropriate actions, including resource allocations for the hazardous contaminants program. Three working groups, all of which report to the management committee, were formed: the hazardous contaminants information system group, the handbook group and the priority list working group.

The environmental health committee, with representation from the ministries of Health, Labour and the Environment, continued to be active.

A major accomplishment was the development of a list of 209 priority substances of potential concern to public health and the environment. A chemical assessment methodology was employed to facilitate the selection of chemicals. A survey is also being undertaken to obtain preliminary industrial information on the occurrence of substances in the environment. At year-end, work was continuing on setting priorities.

The industrial chemicals library continued to collect information on the 209 chemicals and groups of chemicals on the priority list. A computer search on dibenzo-p-dioxins and dibenzofurans was undertaken and compiled into two bibliographies. Acquisition lists were proposed periodically and circulated to other branches and the regions. The library answered requests for information on hazardous contaminants by performing computer searches, distributing journal articles, and lending materials.

Commercial and Agricultural Chemicals Section

The section carries out its programs under the Pesticides Act, and Ontario Regulation 715. It promotes good practices in pesticide use to achieve its goal of environmental protection. The section licenses operators, exterminators and vendors, issues permits for specific pesticides and uses, and provides training courses, seminars, study guidelines and material, including fact sheets, for applicants for licences.

The public is assisted by direct contact with specialists and through the dissemination of publications.

During 1982/83, the section held 2,116 examinations and issued 6,402 exterminator, 1,102 operator and 3,532 vendor licences. It issued 1,035 permits for the use of restricted products on land, 592 permits for the application of pesticides to water, and 207 permits for exterminations in structures.

The study of environmental fate, and monitoring for pesticides, particularly in ground and surface water, is a function of the section. Surface water monitoring data indicate only rare cases where criteria for pesticides have been exceeded.

Control of Termites

Under the termite control program, new infestations were discovered in Hamilton and Amherstburg.

The following is a list of municipalities with which agreements have been concluded and of grants approved for chemical treatments and structural alterations required for the control of termites:

Municipalities	Grants in \$
City of Guelph	3,549
City of North York	10,158
City of Toronto	445,172
City of Mississauga	2,510
Borough of East York	62,928
Borough of Etobicoke	921
Borough of Scarborough	17,250
Borough of York	11,184
Township of Gosfield South	1,161
Township of Nicol	—
Township of Pelee	—
Township of Woolwich	10,757
Township of Mersea	—
Town of Dresden	—
Town of Fergus	—
Town of Kincardine	2,524
Town of Leamington	15,385
Town of Markham	696
Village of Elora	1,921
TOTAL	586,116

Environmental Assessment Branch

Director: P. H. Rennick

The Environmental Assessment Act and Ontario's implementation of the assessment process continue to be of interest world-wide. In 1982 representatives of the governments of Italy, Norway and Poland visited the Ministry to learn the details.

As of March 31, 1983, 93 environmental assessments for individual and class type projects had been received. Their status is as follows:

- 56 approved (with or without conditions)
- 8 exempted
- 8 referred for hearings
- 7 withdrawn
- 2 withdrawn and exempted
- 12 still in process

There were 58 projects at the pre-submission consultation stage.

There were two major private undertakings designated under the Act:

- The energy-from-waste project at Victoria Hospital, London
- The first undertaking proposed by a U.S. proponent — Fighting Island sludge disposal by the City of Detroit.

Work continued on the Class EAs for municipal roads, water and sewage and urban transit projects. The interim exemption covering these projects was extended to allow the Class EAs to be finalized, reviewed and approved.

Non-profit housing projects were exempted from the EA process.

During the year, staff participated in these major hearings:

- Ontario Hydro — Eastern Ontario — Plan Stage EA (electric transmission lines)
- Ontario Hydro — South Western Ontario — Plan Stage EA (electric transmission lines)
- Victoria Hospital — energy from waste
- Royal Commission on the Northern Environment

EA Update, an information digest for professionals interested in EA matters, was published three times.

Laboratory Services and Applied Research Branch

Director: G. C. Ronan

The Laboratory Services and Applied Research Branch provides the Ministry's analytical data base, research in the area of water and wastewater technology, as well as input to survey planning, data assessment, and technical expertise. Client groups that use this data include branches within Regional Operations, Strategic Projects, and the Environmental Planning Division.

Analytical Test Production

Table 1 shows this year's test load summary compared to last year's. In response to increased workload demands, the central laboratory increased its test outputs by 17 per cent over last year. For the first time, Ministry programs required more than 2 million analyses. The regional labs all showed modest production increases (5 to 7 per cent) while the central laboratory had an increase of 10 per cent over last year.

Table 2 shows branch clients and their laboratory workload requirements during 1982/83. Regional programs used two-thirds of the available test capacity: of these, Central Region (28 per cent) and Southwest Region (24 per cent) accounted for more than half the regional testload. Organic analyses in water and air continued to have a high profile.

The programs that the Environmental Planning Division, Strategic Projects, and Regional Operations carry out to monitor water, air and land are too numerous to document individually. The following is an outline of major programs for which analytical support was provided.

The Acidic Precipitation in Ontario Study program grew to more than 300,000 tests, mainly due to increased emphasis on terrestrial effects, sampling of through-fall, stem-flow and spring melt. Besides pH/acidity, the sampling program uses data on trace metals, major cations and anions to assess the impact of acid precipitation on atmospheric processes and aquatic and terrestrial ecosystems.

Organic analyses were characterized by a broadening in the range of parameters requested. The Niagara River program required a study of water, sediments, fish and biota for

TABLE 1: LABORATORY TESTLOAD SUMMARY (X 1000)

	Chemistry		Microbiology		Total	
	81/82	82/83	81/82	82/83	81/82	82/83
London	177	187	50	57	227	244
Thunder Bay	89	93	30	32	119	125
Kingston	106	105	53	64	159	169
Regional Labs	372	385	133	153	505	538
Inorganic Trace Contaminants	340	450			340	450
Water Quality	688	786			688	786
Pesticides	10	11			10	11
Organic Trace Contaminants	78	107			78	107
Microbiology			151	136	151	136
Central Lab	1116	1354	151	136	1267	1490
TOTAL REGIONAL AND CENTRAL LABS	1488	1739	284	289	1772	2028

organics and the laboratory's growing organic vapors capability was used to analyze ambient air levels of organics from numerous locations. A study of incinerator stack emissions was completed at the Commissioner Street, Ashbridges Bay and SWARU sites. Testing included a broad spectrum scan for dioxin and furan isomers.

The main dioxin testing program concentrated on monitoring raw and treated drinking waters from 17 locations. In addition, more than 200,000 anions, toxic metals, trace metals, and routine organic analyses were carried out on raw and treated drinking waters, nearly all of them at the most sensitive end of the analytical scale.

Figure 1 (page 28) shows the distribution of testing at the central laboratory, as a function of sample type. Programs aimed at monitoring water resources account for the major portion, followed by air monitoring, drinking water and sewage treatment programs. Industrial wastes and landfill surveys constituted a small but growing component of the workload.

The air monitoring network, consisting of 200 high-volume samplers as well as numerous other air monitors and samplers sited around the province, generated 130,000 metals, anions and suspended particulate tests. Phytotoxicology, which uses vegetation analyses as an indicator of atmospheric pollution, required more

than 50,000 metals and anions tests.

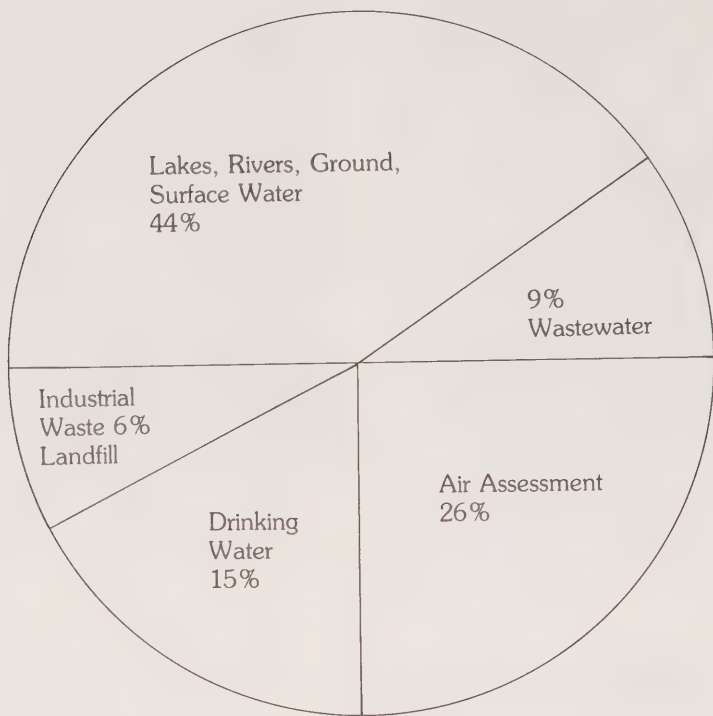
The fish contaminants program remained constant in total test requirements for mercury, trace metals, PCBs and other organo-chlorines. The growth of the Toronto area watershed management survey continued, as waters, sediments and biota were tested for metals, organics, anions, and bacteria in an ongoing effort to monitor Toronto's local tributaries and their input to the Lake Ontario basin. Wet weather surveys were conducted to monitor bacterial levels during storms and snow melt.

As part of the Ministry's concern over the possibility of toxic material issuing from landfill sites, the Elmira-Uniroyal, Tiny Township-Pauze, and Stouffville sites were sampled. These surveys stretched the branch's resources.

TABLE 2: WORKLOAD BY CLIENT

	ITC	WQ	OTC	PEST	MICRO	LAB	TOTAL
REGIONS							
Southwest	43500	4600	18594	488	87	229000	296269
West Central	33329	53699	16836	930	25023		129817
Central	109945	157347	14628	1428	68363		351711
South East	13996	8995	7260	410	1127	169000	200788
North East	37754	94655	4622	239	138		137408
North West	7992	1779	1214	52	106	125000	136143
SUBTOTAL	246516	321075	63154	3547	94844	523000	1252136
HEAD OFFICE							
Water Resources Branch	103524	289680	21772	6709	19595	15000	456280
Air Resources Branch	96438	104160	1567	846	2662		205673
Pollution Control Branch	2722	33689	1613	8	9122		47154
Other Ministries	200	10100		27	400		10727
Miscellaneous		27688	18271		8685		54644
SUBTOTAL	202884	465317	43223	7590	40464	15000	774478
TOTAL	449400	786392	106377	11137	135308	538000	2026614

FIGURE 1: WORKLOAD DISTRIBUTION BY SAMPLE TYPE



Applied Research

The three research sections (Applied Sciences, Wastewater Treatment, and Water Technology) continued to carry out investigative work on water and wastewater technology and on research aspects of waste disposal, water distribution and related topics.

Applied Sciences published four research reports and was involved in eight ongoing research investigations. The work is primarily in the field of pipeline materials and design and cold weather effects on distribution systems.

Wastewater Treatment was involved in 20 developmental research projects aimed at upgrading treatment technology. Projects included investigation of ultra-violet radiation as an alternative to chlorine for sewage disinfection, marshland treatment of municipal wastewater, and studies on the fate of hazardous contaminants during municipal wastewater treatment. Technical assistance was provided to municipalities and industries on matters of plant design, process operation and leachate collection.

The section participated in studies with the City of Stratford to cost-effectively reduce municipal pollution loading to the Avon River, and with Environment Canada in the first attempt to mass balance selected trace organics through a sewage treatment plant. The Section's other major activity is support of Ministry training program's, including activated sludge and chlorination workshops. The Section also operated the Ontario Experimental Facility, a 5.0 MGD plant for wastewater treatment development work and operator training.

Water Technology conducted research studies on trace organic contaminant removal, asbestos, iron and manganese control, and chlorination and ozonation of waters. The technical advisory service, co-ordinated through the regions, involved staff in treatability studies for selection of process/chemical application for 15 municipalities, and in solving water quality problems for more than 100 municipalities. Technical services were rendered which addressed:

- taste and odor control (actinomycetes, hydrogen sulfide)

- treatment plant upgrading
- corrosion control
- micro-macro-biological problems in distribution systems.

Annual Highlights

1982/83 was a year of advance in the laboratory's analytical capabilities. The computerized data system, LIS, entered its second year of operation, and improved turn-around times and data management. The average cost per test for metals analysis returned to pre-1980 levels, showing the rewards for method streamlining, multi-element analysis, and computerized data handling.

In the pesticides and organic trace contaminants sections the following developments highlighted 1982/83:

- Acquisition of a high-resolution mass spectrometer. This equipment will be used to analyze complex environmental samples and corroborate extremely low-level dioxin analysis. Gas chromatography/high-resolution mass spectrometry can analyze down to 1 picogram (10⁻¹² or one trillionth of a gram).
- The organic vapors sampling program resulted in the development of a unique thermal desorption capillary gas chromatograph, multi-component sampling cartridges and an automated sequential sampler. These units will be tested for field applications.
- Resin cartridge sampling became a high priority development item, forced by the need to concentrate trace organics from large volumes of water (up to 200 litres). The concentrates are used for GC/MS testing and isolation of usable quantities of organic compounds for mutagenicity testing.
- Use of capillary GC with multiple selective detectors for simultaneous multi-component scan analysis.
- Development of validated sample extraction and analysis protocols for a broad range of dioxins and dibenzofurans in

drinking water, surface water, and incinerator-related samples.

- Introduction of an automated headspace analyzer based on capillary gas chromatography.

In the Water Quality Section, low injection analysis was evaluated as a speedy automated anions technique with application to a wide variety of sample matrices. A direct-current plasma spectrometer was acquired, for the simultaneous determination of four metals in precipitation samples. The equipment freed up by this unit was applied to calcium magnesium, and hardness analysis in the water lab. New methods were also developed for tritium, iodine and radium in drinking water, as well as a specific ion electrode method for fluoride.

In the Inorganic Trace Contaminants Section, the demand for analysis of trace metals, toxic metals, and anions continued to increase.

Nearly 40,000 samples were analyzed for each of zinc, lead, copper and nickel and another 10,000 for mercury, cadmium and aluminum. Last year 8,000 aluminum tests were required; the three-fold increase this year was due to concern over aluminum as the key component in acid rain's impact on fish.

Major analytical developments in 1982/83 included:

- Direct data transmission between the multi-element atomic emission spectrometers and the LIS.
- Development of inductively coupled plasma atomic emission techniques for the simultaneous determination of up to 20 metals in vegetation and sediment.
- Acquisition and implementation of ion chromatography for soil extract analysis.
- Micro-techniques developed for determining aluminum and electrolyte metals (sodium, potassium) in fish gills and fish sera.
- Add-on monochromators were successfully introduced to one of the atomic emission spectrometers, thereby extending the multi-elemental capacity to include sodium and potassium for routine metal scans.

In the Microbiology Section, most work was carried out as part of the Ministry's surveillance of municipal

drinking water quality. Surveys were also conducted for the Great Lakes program, including inputs from the Niagara and St. Lawrence rivers, Port Dalhousie, and the Lake Ontario waterfront from Burlington to Scarborough. Specialized sulphur cycle bacterial studies were conducted in support of the APIOS program as well as surveys in Thunder Bay and Toronto.

The biohazards unit moved into its new laboratory. The facility cost \$450,000 and provides safe handling for toxic, mutagenic and carcinogenic chemicals, which will be tested as part of the Ministry's growing hazardous contaminants program.

Mutagenicity tests are carried out on biological host systems ranging from bacteria to mammalian tissue cultures. The range of tests was expanded to include:

- Ames salmonella/mammalian microsomal test
- In vivo mouse micronucleus assay
- In vivo mouse abnormal sperm head assay

Major programs were:

Whitchurch-Stouffville (in co-operation with University of Western Ontario and Ontario Research Foundation), Tiny Township/Pauze Landfill site, and development programs aimed at improving the effectiveness of the Ministry's biohazard testing capability.

Virological studies were carried out at Ashbridges Bay sewage treatment plant, Tillsonburg sewage treatment plant and at Boyd conservation area.

Many samples were analyzed in response to unique environmental problems, hospital requests, court actions or as supporting information for insurance claims or ministerial orders.

Highlights include:

- A Burlington resident complained that a large mass of "putty-like" material had been deposited on his property. The sample was shown to be a massive pollen ball agglomerated and held together by water.
- Residents complained of large clumps of white fibers which they feared might be asbestos, accumulating in their yards. Analysis proved them to be mineral wool from a "blown-in insulation" project being carried out near the neighborhood.

- Due to complaints in the vicinity of an abrasives plant in Niagara Falls, particulate matter was analyzed and the results compared to those obtained on household dust from the complainants' homes. There was nothing to connect the household dust to emissions from the factory.
- Blood samples taken from two Newmarket children showed high levels of lead, prompting authorities to remove the children from the home until it was cleaned and repainted.
- A drinking water sample from a well in Nigeria and one from the Dakhla Oasis in southern Egypt were analyzed for metals and anions.
- Samples of bottled water from local stores were analyzed for metals and anions, and data compared to that from Toronto tap water. No commercial product was found to be superior to the tap water, while some bottled waters did not meet Ontario drinking water objectives.
- The interim drinking water monitoring program was developed to address concerns over trace organics in raw and treated drinking water.
- The Niagara Falls water treatment plant organic trace contaminants removal study was developed as part of an overall effort to monitor the effectiveness of granular activated charcoal in water purification.

Quality Control

Quality control/quality assurance continued to be a key factor in all branch activities. An estimated 130,000 additional tests of all types were performed as part of an effort to validate and control analytical data reported to clients.

Numerous round-robins were initiated or participated in, including:

- cyanide in waters
- mercury in fish, water, and sediment
- metals in precipitation, waters, sediments and air particulates
- general chemistry parameters in natural waters from across Canada

- nutrients in sewage

These were in addition to the ongoing International Joint Commission, Canada Centre for Inland Waters and Federal Fisheries interlaboratory comparisons.

Numerous ad hoc comparisons were carried out with industries and municipalities, and within the branch, studies were undertaken to provide corroborative analyses of important health and legal samples. A good example of this is the application of the new high resolution mass spectrometer to confirmatory dioxin analysis.

Administrative Services

This Section co-ordinated the personnel, financial and budgetary functions for the branch, was responsible for the laboratory and research facility, and provided a health and safety program within the complex. Some \$900,000 worth of chemicals and glassware were issued to the laboratories and research sections. Nearly one million bottles and tubes were washed, sterilized, processed, or shipped in support of Ministry sampling activities. The group also operated the computerized laboratory information system, which progressed from handling 60 per cent of the sample workload last year to 99 per cent this year.

An immunization program for the staff was carried out. Courses and seminars in first-aid, CPR and safety in the workplace were also provided.

Other Activities

Laboratory and Applied Research personnel chaired and participated in numerous technical/scientific committees. Staff presented 13 technical papers at scientific symposia, while six technical papers were published. Twenty-four in-house technical reports were published. The open house held by the branch in September 1982 attracted 3,500 persons. Besides this, visitors from Africa, China, Australia and Europe toured the facilities, and the newsletters Analysis and Dioxin News were circulated to hundreds of scientists and laymen.

regional operations division

Assistant Deputy Minister:
D. P. Caplice

This Division is the compliance and delivery arm of the Ministry. Its job is to enforce regulations, control emissions, and establish abatement programs.

The role of the six regions and one head office branch is to:

- Regulate pollution sources
- Regulate construction and operation of wells
- Oversee the proper development, operation and closure of waste management sites

- Regulate storage and use of pesticides
- Manage and operate Ministry water and sewage plants and systems
- Monitor the quality of the natural environment
- Respond to public complaints and environmental emergencies
- Encourage the use of environmental safeguards in land-use plans

- Evaluate projects and to monitor environmental assessment recommendations
- Regulate water use
- Monitor and investigate discharges to the environment
- Control major noise sources

In addition to the six regional offices, this Division also contains:

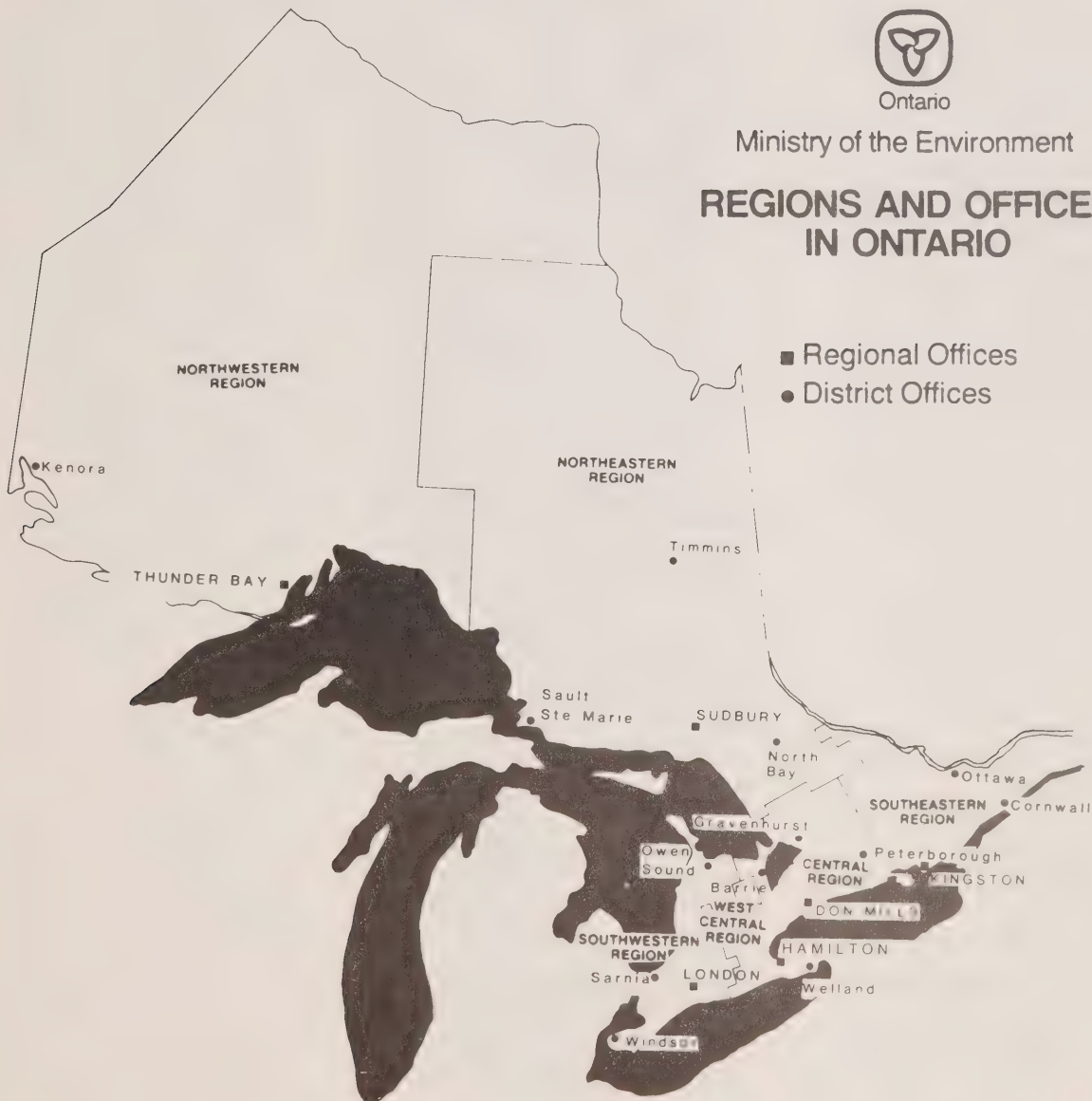
- Environmental Approvals and Project Engineering Branch



Ministry of the Environment

REGIONS AND OFFICES IN ONTARIO

- Regional Offices
- District Offices



NORTHWESTERN REGION

Thunder Bay Regional Office,
435 James St. S.,
Thunder Bay P7C 5C6
Tel.: 807/475-1205

Kenora District Office,
808 Robertson St.,
Kenora P9N 1X9
Tel.: 807/468-5578

NORTHEASTERN REGION

Sudbury Regional Office,
199 Larch St.,
Sudbury P3E 5P9
705/675-4501

Timmins District Office,
83 Algonquin Blvd. W.,
Timmins P4N 2R4
Tel.: 705/264-9474

Sault Ste. Marie District Office,
445 Albert St. E.,
Sault Ste. Marie P6A 2J9
Tel.: 705/949-4640

North Bay District Office,
1500 Fisher St.,
Northgate Plaza,
North Bay P1B 2H3
Tel.: 705/476-1001

Parry Sound District Office,
74 Church St.,
Parry Sound P2A 1Z1
Tel.: 705/746-2139

CENTRAL REGION

Toronto Regional Office,
7 Overlea Blvd., 4th Floor
Toronto, Ontario M4H 1A8
Tel.: 416/424-3000

Barrie District Office,
12 Fairview Rd.,
Barrie L4N 4P3
Tel.: 705/726-1730

**Muskoka-Haliburton
District Office,**
Gravenhurst P0C 1G0
Tel.: 705/687-3408

Peterborough District Office,
139 George St. N.,
Peterborough K9J 3G6
Tel.: 705/743-2972

Halton-Peel District Office
1226 White Oaks Blvd.,
Oakville L6H 2B9
Tel.: 416/844-5747

SOUTHWESTERN REGION

London Regional Office,
985 Adelaide St. South,
London N6E 1V3
Tel.: 519/681-3600

Windsor District Office,
250 Windsor Ave., 6th Floor,
Windsor N9A 6V9
Tel.: 519/254-5129

Sarnia District Office,
265 North Front St.,
Suite 109,
Sarnia N7T 7X1
519/336-4030

Owen Sound District Office,
1180 Twentieth St.,
Owen Sound N4K 6H6
Tel.: 519/371-2901

Chatham Sub-District Office,
435 Grand Ave. W.,
Chatham N7L 3Z4
Tel. 519/352-5107

WEST CENTRAL REGION

Hamilton Regional Office,
119 King St. W.,
Hamilton L8N 3Z9
Tel.: 416/521-7640

Cambridge District Office,
400 Clyde Rd.,
Cambridge N1R 5W6
Tel.: 519/623-2080

Welland District Office,
637-641 Niagara St. N.,
Welland L3C 1L9
Tel.: 416/735-0431

SOUTHEASTERN REGION

Kingston Regional Office,
133 Dalton St.,
Kingston K7L 4X6
Tel.: 613/549-4000

Ottawa District Office,
2378 Holly Lane,
Ottawa K1V 7P1
Tel.: 613/521-3450

Cornwall District Office,
4 Montreal Road,
Cornwall K6H 1B1
Tel.: 613/933-7402

Belleville District Office,
15 Victoria Ave.,
Belleville K8N 1Z5
Tel.: 613/962-9208

Pembroke District Office,
1000 MacKay St.,
Pembroke K8A 6X1
Tel.: 613/732-3643

Northwestern Region

Director: W. M. Vrooman

Industrial Abatement

The monitoring of discharges of wastes from the pulp and paper and mining industries makes up the major workload for this section.

The control order process is the major abatement tool used to require reductions in the discharge or emission of contaminants by industries to air, water or land. In 1982/83, three control orders were issued to companies. It is expected that the companies concerned will spend approximately \$59 million in complying with them.

All major industries in the region are operating under the requirements of a control order or are in the process of having a new control order negotiated. The pulp and paper industry in Ontario is concentrated in the Northwest Region. In order to properly monitor discharges from this industry, the region continued the operation of a mobile toxicity testing laboratory located in Thunder Bay. The monitoring for toxicity continues to be a high priority as several of the control order requirements specify that discharges must become non-toxic.

The discovery of the Hemlo gold field 300 km east of Thunder Bay has greatly increased mining activity in this region. With the spin-off interest in gold exploration expanding to other areas, the workload of field staff has increased.

During 1982/83, regional staff investigated 63 spills and 125 complaints. The Ministry operates a 24-hour emergency number which received 51 off-hour calls, 26 of which required a response or investigation.

In January 1983, regional staff dealt with a spill of diesel fuel to a lake 160 km north of Red Lake. It occurred under Arctic conditions and could have caused considerable problems had it not been detected and properly cleaned up. The discharger cleaned up the fuel at a cost in excess of \$200,000.

The discharge of grain dust from elevators in Thunder Bay continues

to be monitored. In 1982, several problems in handling dust from the baghouses on the elevators were discovered. These problems were quickly resolved. The Ministry's air monitoring network in Thunder Bay shows that dustfall levels in the vicinity of the elevators continue to meet requirements.

In the 1982/83 fiscal year, 11 provincial offence tickets were issued, resulting in 10 convictions.

Municipal and Private Abatement

Nine major water and sewage projects were in various stages of construction, or completed in 1982/83. Included was a 0.42 MGD biological sewage treatment plant serving the Township of Marathon. The plant operates at half capacity and could accommodate additional growth expected with the Hemlo development.

Regional staff dealt with two communities under the private systems grants program in the provision or improvement of water supply systems.

The Red Lake waste site, which was filled to capacity, and eight Ministry of Natural Resources sites were closed. Red Lake joined with an adjacent municipality to develop one site. The MNR sites were closed, either due to being filled or because better sites were found. One privately operated site, serving the hamlet of Caramat, reverted to MNR operation. Fourteen municipalities improved their waste facilities.

Regional staff assisted head office staff in gathering data and planning field inspections of all waste disposal sites as part of the waste site inventory program. In addition, major leachate migration monitoring programs, initiated during 1981, were continued. Included were the municipalities of Marathon, Manitouwadge, Thunder Bay, Nipigon and Red Rock. Special leachate studies were concluded at the Balmertown/Red

Lake and Dryden sites.

Six water well investigations were undertaken in response to requests by health units or individuals. In most cases, they were related to possible oil or chemical contamination.

Marinas and pleasure boats were inspected for pollution infractions. These inspections were conducted on a spot check or complaint basis, and no violations were noted.

A total of 117 cottages were inspected on four lakes (Maki, Pike, Cummins, Warnica) in the Thunder Bay District, under the cottage pollution control program. Twelve cottage-owners were required to take abatement action resulting from the 1980 inspection program.

A marked improvement was noted in water quality of the Atikokan River as a result of the completion of the Atikokan sewage treatment plant project. In Schreiber the new distribution system has improved the bacteriological water quality and reduced user flows.

Staff assisted the Improvement District of Balmertown in developing a five-year capital works program which will result in major upgrading of sewage and water facilities at the Cochenour and Balmertown townsites.

Utility Operations

In 1982/83, the region operated 12 water and 16 sewage projects serving approximately 18,000 and 39,000 people respectively.

The emphasis in utility operations centered around solving the problems of small communities. Red Lake continued its program of insulating looped water mains and undertaking a program to reduce losses. This problem was addressed in numerous communities.

A new water distribution and sewage collection system was installed in Madsen. This was necessary due to excessive freezing and advanced deterioration of the old system. The latest technology of insulated, heat traced piping and innovative engineering were used. This resulted in a cost-effective system for a small community with difficult terrain and severe climate.

The problem of severe corrosion, causing premature failure of water mains in Emo, was investigated. As a result, a program has been established for complete cathodic protection and/or replacement of the system.

Air Quality

The region currently operates 110 air quality monitors and precipitation samplers.

In 1982/83, the region:

- Continued an air quality monitoring and phytotoxicology program in support of industrial abatement activities in the pulp and paper, mining and grain elevator industries.
- Expanded the air quality monitoring network to Marathon, to provide full coverage of kraft pulp mills.
- Participated in the development of an Air Quality Index (AQI) and telemetry system.
- Continued the pre-operational monitoring program near Ontario Hydro's thermal generating station at Atikokan.
- Published an air quality report for 1981, as well as other technical reports on air quality surveys.
- Managed the development of the acid rain terrestrial effects study contracted to Lakehead

University, and provided support to the precipitation sampling program conducted by Air Resources Branch in Northwestern Ontario and Northern Minnesota.

Water Resources

Water quality monitoring was maintained at 49 stations. Eleven supported the International Joint Commission tributary monitoring program.

Nine new permits to take water were issued and four permits were renewed.

Twenty water quality assessments were undertaken in relation to industrial effluents, sewage treatment plant effluents, drinking water quality, dredging of contaminated sediments, and lake eutrophication.

Fifteen groundwater quantity and quality assessments were completed. Additionally, 22 salt storage areas, operated by the Ministry of Transportation and Communications, were evaluated for their potential for groundwater contamination. A total of 380 water well records were verified.

By direct sampling and through management of an acid rain aquatic effects program at Lakehead University, the region evaluated the sensitivity to acidic precipitation of 100 lakes. Lakes near Atikokan were monitored to establish baseline conditions prior to emissions from the thermal generating plant of Ontario Hydro. A group of lakes in Pukaskwa National Park were discovered to be among the most acid-sensitive in Ontario.

Studies were made to investigate mercury pollution in the English/Wabigoon River system and to evaluate abatement measures at the Dryden paper mill.

Rainy River water quality was assessed and a report was prepared for the international Rainy River Water Pollution Control Board. The report indicated that water quality had improved as the result of improved effluent quality from the Boise Cascade Ltd. pulp and paper mill at Fort Frances.

Laboratory

During 1982/83, the chemistry unit performed 92,956 analyses on 12,986 samples while the microbiology unit performed 32,505 analyses on 13,260 samples. The total of 125,461 analyses amounted to an increase of 5.3 per cent over the previous year.

New analytical capabilities were developed for aqueous low-level total mercury and methylmercury, enumeration of *E. coli* and detection of toxigenic *Aeromonas*. An automated atomic absorption procedure for aqueous calcium and magnesium analyses was initiated. Standard plate count was introduced as an additional monitoring capability for municipal drinking water supplies.

An open house was held at the regional laboratory to commemorate the Ministry's 10th anniversary.

Environmental Planning

Twenty-six subdivision plans, 13 official plans or amendments and 15 environmental assessment reports were reviewed and a comprehensive regional environmental planning program was maintained.

Northeastern Region

Director: W. J. Gibson

Industrial Abatement

During 1982/83, charges were laid against Algoma Steel Corp., Algoma Ore Division, with respect to an October 20, 1981 fumigation in Wawa. The company was found guilty and fined \$3,000. Incidents of SO₂ fumigations have been drastically reduced over the last year, primarily as a result of improved operating procedures by Algoma brought about by Ministry investigative activities. In addition, a new control order was issued to Algoma providing for extensive air and water pollution abatement programs which, when completed, will put the company in compliance with Ministry objectives.

An investigation of a fish kill on the Spanish River indicated poor flow regulation which resulted in dissolved oxygen depletion. A study group composed of Inco Limited, E. B. Eddy Forest Products Ltd., Ministry of Natural Resources and the Ministry of the Environment was established to identify flow management requirements. Certificates of approval were granted to E. B. Eddy at Espanola for pollution abatement equipment for air and water emissions. A secondary treatment system composed of surface area lagoons and spray pond will reduce BOD₅ levels to the Spanish River to 8,000 lb/day, as well as permit discharges to meet federal toxicity levels. This system is expected to come on-stream prior to December 31, 1983.

Reichold Limited installed a \$1.5 million biological waste treatment facility at its North Bay resin manufacturing plant. The purpose of the facility is to pretreat plant waste waters to reduce organic loading on the North Bay water pollution control plant.

A prosecution was initiated against Grant Waferboard of Englehart for illegal operation of a woodwaste disposal site. The company pleaded guilty to 15 charges and was fined \$5,000.

Two major mining companies, Inco and Falconbridge, were on extended shutdowns. A certificate of approval was granted to Falconbridge for the Moose Lake treatment system which will result over the next five years in substantial decreases in nickel discharges to the Onaping River.

Court cases against Falconbridge and Inco were active with charges against Falconbridge relating to the discharge of mine water to Fecunis Lake and against Inco for exceeding the ground level concentration of sulphur dioxide specified in the control order. In the Falconbridge case, the company was found guilty and fined; however, both the company and the Ministry are appealing. The Inco case will continue into the next fiscal year. Inco was also investigated for failure to report a nickel carbonyl emission to the atmosphere. No charges were laid as the investigation revealed the failure was not intentional or an oversight.

Kilborn Engineering was engaged by the ministries of the Environment and Natural Resources to establish close-out scenarios for the abandoned Kam-Kotia Mine area which continues to discharge acidic waters with a high metal content causing impairment to two rivers.

Negotiations with the Atomic Energy Control Board commenced regarding the final closing of the Agnew Lake mine property. AECB plans to extend the operating licence to require post-closing monitoring by the company for a specified period before the company will be permitted to withdraw completely. This is the first complete closing of a uranium operation in Ontario.

Municipal and Private Abatement

The private services funding project for Whitefish/Den-Lou was continued in 1982/83 and additional Ministry surveys were undertaken or continued for Kusk Lake, McCrae Heights, Wahnapiatae East, and Romford Station in the Regional Municipality of Sudbury. Staff were involved in the implementation of a private services funding project to upgrade septic tank systems in Cache Bay. A consultant was hired to undertake a study of private water and sewer systems in Trout Creek.

Wells were developed in Gogama and a distribution system was constructed to provide 300 people with potable water. Drilled wells were constructed in Powassan and Trout Creek to replace a surface supply and a poor shallow well system, respectively. A project to upgrade waterworks facilities in Dubreuilville was granted an exemption order. White River was approved for funding of new water and sewage works under the Ministry's direct grant program.

The Ministry announced that Timmins will receive a \$4.6 million grant for the expansion of the water filtration plant. A joint project to upgrade the water and sewage facilities in Sault Ste. Marie is under construction. It is anticipated that a major part of the infrastructure phase will be complete by the end of this year. The projects, when complete, will provide the municipality with a

new surface water supply at Gros Cap and the second sewage treatment plant to be located in the west end of the city.

District staff assisted in the construction and monitoring of the Cobalt Marsh experimental facility utilizing cattails as a means of sewage treatment. This project will continue next year and is being jointly funded with the Ministry of Northern Affairs.

Funding under the Ministry's waste management improvement program has been extended to Thessalon and the Townships of Laird and Thompson for upgrading their individual waste disposal sites. Smooth Rock Falls submitted an environmental assessment to the Minister for the establishment of a new waste disposal site. The environmental assessment was approved.

A waste management study for Little Current was completed regarding the establishment of a new landfill site to service the town. Waste management funds for site improvements were provided to serve municipalities in the Sudbury and Manitoulin districts. Staff also were involved in the first stage for a new landfill site for Onaping Falls in the Regional Municipality of Sudbury.

Sault Ste. Marie and Cherokee Disposals Ltd. are proposing to submit a joint application for a new landfill site. Investigations into the longevity of the existing Cherokee site have revealed it to have an available capacity for 3.2 years. Staff worked with the Ministry of Natural Resources as three unsatisfactory waste disposal sites were closed in the Lake Temagami area. The number of disposal sites on the lake shore has now been reduced to two, from ten in 1978. When this program is completed, cottagers and residents will be served by a landfill site with a waste transfer station.

Abatement staff investigated 259 spills and 1,127 complaints.

Air Quality

The region operates an air quality monitoring network consisting of approximately 160 monitors. In the Sudbury area, the network collects air quality data on a real-time basis from about 25 sensors. These data are telemetered via telephone

lines to a data acquisition centre at the Sudbury office. This telemetry network enables real-time surveillance of the Inco Ltd. supplementary control system which the company operates under a control order, to limit SO₂ ground level concentrations. In 1982, the network was expanded to collect meteorological data from Hanmer and Elliot Lake.

The region outfitted a four-wheel-drive van to serve as a mobile air monitoring unit. This will enable staff to conduct air quality surveys at any location accessible by road and to assist abatement staff in monitoring the release of hazardous substances to the atmosphere in contingencies.

Staff also maintained vegetation and soil surveillance studies in order to determine the degree and extent of air pollution injury to vegetation, and also to determine trends for contaminant levels in soils and vegetation. Pre-operational soils and vegetation sampling surveys were conducted in the vicinity of Eldorado Nuclear Ltd. and Blind River and at the site of the proposed phosphate mine in Cargill Township near Kapuskasing.

Staff responded to 38 complaints regarding suspected air pollution injury to vegetation.

Water Resources

The region maintained 173 water quality monitoring stations to assess the success of water treatment facilities at industrial and municipal sites. Nineteen stations are operated intensively over the warm-water, low-flow summer period to verify the predicted capacity of rivers to assimilate wastes.

Studies on the impacts of mining-milling operations on receiving water bodies were completed. Biological impact assessments on the pulp and paper rivers were continued and extensive recreational lake water quality inventories were expanded.

Inspections were carried out on 800 newly constructed wells, the impact of mine tailings disposal on groundwater resources was evaluated and monitoring of groundwater quality in relation to specific complaints was undertaken.

Approvals and Planning

The unit reviewed 70 quasi approvals under various legislation. Twenty-three environmental assessment and study reports, 36 land use planning documents, and 50 certificates of approval for landfill and organic soil conditioning sites were issued. Forty-seven applications for water taking permits were reviewed and permits issued.

Pesticides

Staff investigated 12 pesticide-related complaints and inspected the premises of 240 licensed retail and wholesale pesticide vendors.

An aerial surveillance program was undertaken to monitor the use of pesticides by the pulp and paper industry. It indicated that the application generally followed the guidelines and regulations under the Pesticides Act.

Ten water extermination permits were issued for the control of nuisance aquatic weeds and black flies. Ten special use permits were issued for the control of bats and bees.

Utility Operations

The utility operations section continued the operation of 22 water treatment plants and 43 water pollution control facilities serving a population of approximately 245,000. The region also started expansions of water pollution control facilities at North Bay, Parry Sound and Powassan. Upgrading of the water distribution system at White River began.

The sludge utilization program in Northeastern Region continued during 1982/83 with the operation of sites and systems for 12 water pollution control plants.

Southwestern Region

Director: D. A. McTavish

Industrial Abatement

Fighting Island — Detroit River: Fighting Island has been used by a soda ash manufacturer in Michigan for the disposal of solids which were deposited in waste settling beds created on the island. Analysis of herring gull eggs has given rise to a concern that organic contaminants in the eggs may have originated from material in the waste beds.

Extensive analytical work on samples of the settled solids, the waste stream flowing to the island, liquid discharge from the island and sediments in the river around the island has failed to demonstrate that organic compounds are contained in the wastes in significant quantities.

The process which generated the wastes directed to the island is no longer in operation.

Polysar — Biological Oxidation Treatment Plant, Sarnia: In the manufacture of synthetic rubber products, several wastewater streams are generated which contain substantial quantities of organic materials, many of which are detrimental to the St. Clair River. The company was placed under a requirement and direction order in 1976 which established a five-year abatement program. Interim organic loading reductions were achieved by 1978 and in 1982 a large-scale biological oxidation wastewater treatment plant began operation. Early indications, based on effluent monitoring results, are that the design objective for contaminant removal efficiency will be fully met. Capital cost of the works was \$23 million.

Stream Pollution from Livestock Operations — Prosecutions: In the three years prior to 1982, the region carried out extensive programs aimed at acquainting farmers with the toxicity of livestock manure to aquatic life and the unsatisfactory handling and storage practices which lead to gross pollution of streams, often resulting in major fish kills.

Although the incidence of these occurrences appears diminished, the problem is still one of concern.

Complaints from downstream farmers whose use of surface water for livestock watering is interfered with indicate an additional concern.

Following investigations of several incidents, the region undertook 12 prosecutions of livestock farmers. Eight involved hogs, one poultry, and three beef cattle. Negligence was considered a factor in all of these incidents. Eleven convictions were secured with fines in the range of \$500 to \$3,000.

Municipal and Private Abatement

Activities for this section included:

County of Oxford: Staff worked closely with the County of Oxford in the examination of a landfill site proposal which would carry the county through the next 15 years. The county worked on the site proposed for approximately eight years, spent in excess of \$1 million, and had Ministry approval for the technical aspects. The consolidated hearing board was unconvinced that the site should proceed as designed in the location chosen and turned the proposal down. This has led to an appeal by the county.

The county has now almost run out of landfill space and region staff have been working with county staff in order to secure emergency sites until a permanent facility can be established.

Fighting Island: The proposal to rehabilitate Fighting Island utilizing waste treatment plant sludge from Detroit has proceeded much more quickly than in the past.

The proposal will be subjected to the environmental assessment process and approval or rejection will not take place until public review has been completed. It is anticipated that the hearing could take place during 1983/84.

City of London: Staff became heavily involved with both the public and the proponent in the proposed Victoria Hospital energy-from-waste project. The project was finally subjected to an environmental assessment and the public review of the documentation was completed shortly before the end of 1982. An extensive hearing was started in early 1983 and completed in early June.

Waste Management Studies: In keeping with the Ministry's urging that waste management systems be consolidated, three counties have taken advantage of funding available in order to undertake waste management studies. The County of Essex has undertaken a 16-month study which has looked at various alternatives for a 20-year period. The committee is deliberating the alternatives and choosing the direction it should take. It is anticipated that an alternative will be available before the present landfill sites are full.

The County of Kent, in conjunction with the City of Chatham, has undertaken an examination of the potential for converting refuse to energy through burning.

The County of Bruce has also undertaken a waste management study. The study is now complete and is being deliberated by County Council and various municipalities.

Air Quality

Sixty-four continuous air quality monitoring instruments were operated in 1982/83, along with 78 suspended particulate samplers. At year's end, 39 monthly sampling monitors (dustfall and fluoridation) were in operation.

Air quality reports were completed for Sarnia, Windsor and the Michigan-Ontario transboundary area.

Special studies and developments included:

- Assessment of the impact of quarry operations in the Beachville area, including improved monitoring of different particle sizes and identification of particulate components.
- Monitoring of lead in the vicinity of a new battery plant in St. Thomas.
- Continuation of monitoring for radioactivity in suspended particulates in the vicinity of the Bruce nuclear power development site.
- Monitoring for chloride in suspended particulates near a salt manufacturer in Windsor.
- Review of potential air quality effects associated with an energy-from-waste plant for Victoria Hospital, London.

- Participation in developing organic vapor sampling methods, an ozone control strategy for Ontario, formulation of a new Air Quality Index and an improved provincial telemetry system for transmitting air quality data.
- Development of improved suspended particulate sampling and equipment to provide samples to reflect the influence of varying meteorological conditions (wind direction and speed).

Water Quality

Surface water assessment continued to increasingly focus on agricultural impacts on water quality. Intensive agricultural use of the Rondeau Bay watershed has resulted in excessive turbidity and a poor fishery. Water quality studies on the bay continued, and staff worked with other ministries and a local farm group to develop an erosion control plan.

Studies on agricultural impact were also carried out on two sub-watersheds of the Maitland watershed. Staff worked with the Maitland Conservation Authority, through a consultant, in evaluating the relative importance of impacts such as cattle access, soil erosion, drain clean-out activities and the lack of stream buffer strips as a basis for corrective actions.

Regional water resources staff assessed the impacts of several fish hatcheries. All new hatcheries now require Ministry review, and a certificate of approval. Basic hatchery effluent treatment such as a settling pond is normally required.

Eight sewage treatment facilities were evaluated to ensure compliance with Ministry water management objectives or to provide guidance for expansion or upgrading of treatment works. Work also continued on innovative, pilot-scale treatments including the Listowel artificial marsh, and the snow-making facility at the Blue Mountain ski resort where partially treated sewage was converted to snow.

Regional involvement continued in the Stratford-Avon River program, which revealed that additional environmental controls are required both in the City of Stratford and

throughout the agricultural portion of the watershed.

Monitoring of water quantity and/or quality was carried out at 135 stations within the regional network.

Further mapping of the sensitivity of groundwaters to pollution was carried out by staff under supervision of Water Resources Branch personnel. Approximately 50 per cent of the region has now been mapped.

An investigation was completed into the impact of agricultural fertilizers on a municipal well in the village of Hensall. This supply has become polluted by nitrate from farming activities and plans have been developed to initiate remedial measures with help from the farming community and the Ministry of Agriculture and Food.

Further study was made of the effect of intensive farming practices on private, shallow wells in Essex County.

With the assistance of the Ministry of Labour's laboratory, monitoring and more detailed study of natural radioactivity levels in municipal wells were carried out.

Waste disposal operations took up a large percentage of groundwater staff time. Investigations of problem sites, groundwater monitoring, review of hydrogeological and design reports and attendance at hearings were necessary for numerous sites. This work has resulted in remedial measures and improvements at many waste disposal operations.

Several large spills of gasoline and industrial chemicals required assistance in the evaluation and cleanup of contaminated groundwater.

Water well inspection staff checked 1,200 new wells for proper construction and/or pump installation. Other private and municipal wells were inspected for construction problems and assistance was provided in the plugging of abandoned wells.

As a result of concerns for potential contamination of groundwater, a study was commissioned into the environmental implications of deep well disposal of brines to the Detroit River group of formations. This will provide a basis for this Ministry and the Ministry of Natural Resources to assess requirements for the operation of existing and proposed deep disposal wells.

Utility Operations

The section operates 104 treatment facilities including 49 lagoons, 28 water supplies (18 are surface water sources) and 27 mechanical sewage treatment systems. In addition to the collector and distribution systems associated with the majority of these 104 projects, 12 other collector and distribution systems which include portions of municipally-owned treatment facilities are operated by this section.

Because of municipal government requirements, another 52 collector and distribution systems are operated as individual projects. The operation of these facilities results in servicing a population of approximately 750,000, many of whom are served by both water and sewage systems.

Five new projects were completed: One mechanical sewage treatment plant, two lagoon systems and two water treatment plants. In addition, four expansions were completed: One sewage treatment plant, two lagoon facilities and one pump station and collector system. The total cost is approximately \$14 million.

Two new treatment facilities (one lagoon and one mechanical plant) are under construction and another three (one water plant and two mechanical sewage treatment plants) are in design stages. In addition, six existing treatment plants (five lagoons and one water plant) are under expansion. Another 18 existing systems are in design stages for expansion (eight lagoons, seven water treatment plants and three sewage treatment plants).

Negotiations are nearing completion for the takeover of two Ministry of Government Services plants (one water and one sewage).

Environmental Planning

The unit reviewed and responded to 101 land use planning submissions and vetted approximately 800 restricted area bylaws. Twenty-nine new water taking permits were issued and 141 were renewed. Comments were provided to the Ministry of Natural Resources on 30 applications for licences under the

Pits and Quarries Control Act and six for approval under the Lakes and Rivers Improvement Act. A total of 17 environmental assessments were reviewed. In response to public and municipal enquiries, 26 interpretations were provided on the applicability of the environmental assessment legislation to municipal undertakings. One pipeline proposal was reviewed and the unit co-ordinated and provided input to 19 engineering reports dealing with sewer and water projects. Comments were provided to head office on 11 policy papers and guidelines.

The unit presented a discussion paper at the Ministry's land-use planning seminar on municipal bylaws prohibiting waste disposal sites. Expert testimony was provided before the consolidated hearings board on the Salford landfill site. Staff participated in three Ontario Municipal Board hearings in support of Ministry objections to municipal land-use plans. The unit assisted the land-use co-ordination section in its review of the hearing officer's report of the Niagara Escarpment Plan and provided input to the branch's formulation of land-use compatibility policies for pits and quarries.

Laboratory Operations

In support of regional environmental evaluations and pollution control programs, the regional laboratory performed 187, 013 chemistry tests on 24, 306 samples and 57,301 microbiological tests on 19,933 samples.

West Central Region

Director: G. H. Mills

Industrial Abatement

The following highlight initiatives by this section:

Atlas Steel control order was amended to require compliance by September 1983. A solidification plant to treat waste acids, alkalis, and rinse waters has been essentially completed at a cost in excess of \$6 million. Start-up is anticipated in July 1983.

Cyanamid Canada's Welland plant remained in compliance with its control order and construction is now complete on containment and product storage ponds required to contain effluent and concentrate it into a saleable product. Start-up is planned for 1983, well ahead of the date in the control order of September 1984. Cyanamid also completed installation of an ammonia nitrate drying train, eliminating old equipment which was a source of emission.

Ontario Paper Company ceased operation of five old paper machines and the ground wood mill with the result that all waste water is now treated. The control order was extended to December 1983 to allow sufficient time for equipment commissioning.

Norton Abrasive Company extended its main stack to 250 feet and it is expected that emissions of hydrogen sulphide and sulphur dioxide will now comply with Ministry standards.

The Old Walker Brothers quarry landfill in Thorold ceased operation and the new landfill was opened.

Rothsay Concentrates Company completed installation of a new waste water treatment facility. Effluent is stored and irrigated on company property. Significant operating problems were encountered and satisfactory effluent treatment is now expected in 1983.

Breslube Industries waste oil-refining plant in Breslau remains the most significant source of odor complaints. Although a number of modifications to control equipment were made, a study by the Ontario

Research Foundation confirmed several sources of intense odor. As a result, a new program has been developed with satisfactory emissions to be achieved in 1984. A control order has been drafted.

Guelph Do-Lime completed a program to eliminate or control fugitive sources of lime dust. Stack sampling of the lime kilns was contracted to the Ontario Research Foundation.

In Hamilton, Stelco and Dofasco continue to be in compliance with control orders. Both companies completed a variety of environmental projects at a cost in excess of \$10 million.

Ontario Hydro in Nanticoke installed new NOx burners on Unit No. 5 at a cost of \$1.5 million and indicated an intention to proceed on the other units.

The region overall handled 1,896 complaints largely related to odor, smoke, dust, water and noise. It investigated spills at 56 point sources and 13 on highways.

The Special Investigation Unit was involved in 84 investigations, which resulted in four prosecutions.

Achievements included:

- An investigation into 19 missing PCB-contaminated transformers was concluded successfully after 10 months of work. No charges could be laid due to the six-month statute of limitations in effect at the time the incident occurred. However, following the investigation, Industrial Abatement ensured proper clean-up and storage was carried out.
- An investigation into chemicals dumped beside the Welland Canal concluded successfully when the suspect was found after several months of investigation. A charge has been laid and the case is before the courts.
- A major investigation, conducted jointly with Industrial Abatement, is being undertaken at a major industry in the Region of Niagara. The case involves buried wastes.
- The unit was instrumental in preparing and implementing a province-wide program on Regulation 299 which controls containers for carbonated soft drinks.

Municipal and Private Abatement

Regular inspection and monitoring of water plants, sewage plants and waste disposal sites — both municipally and privately owned or operated — is an important element in the section's activities.

A total of 441 inspections were carried out at 275 water treatment and sewage plants, and 1,003 inspections at 349 waste disposal sites (including landfill and sewage sludge sites).

Sewage Works

The Town of Palmerston is proceeding with a multi-year program of sewer replacement prior to construction of a new sewage facility.

The Town of Mount Forest is requesting Ministry funding for repair and replacement to its sanitary sewer and storm sewer system. This work may be cost-effective in delaying a sewage plant expansion.

A plant expansion to triple the capacity of the Paris sewage treatment plant has been completed.

As part of a major expansion to the Town of Orangeville sewage treatment plant, an interim expansion was carried out to provide air augmentation and improvements to the sand filter systems. This has resulted in the plant producing one of the better effluents in the province. Discharge is to the headwaters of the Credit River, a sensitive cold-water fishery.

A certificate of approval was granted for the conversion of the Waterford lagoons to seasonal discharge to improve water quality in Nanticoke Creek.

Ash slurry from sludge incineration at the Hamilton STP is now being directed to large concrete tanks where the supernatant is sent back to the STP rather than to Redhill Creek. This ash will be used for road construction.

Surveillance of septage haulers discharging into the Hamilton STP has resulted in revamping of the region's record-keeping and closer monitoring.

The Phase III program on upgrading the Welland sewage treatment plant was completed and was

in full operation in early 1983.

The Stevensville/Douglastown lagoon and outfall with 75 per cent funding from this Ministry was completed and ready to be utilized. However, because of the flood plain mapping controversy local residents refused to hook up in protest.

A provincial sewerage project was undertaken at the Town of Fort Erie. Low cost alternative projects were approved for Queenston and Port Robinson.

Filter backwash water from the Fort Erie water treatment plant is now being treated by a sedimentation process prior to discharge into Lake Erie. Also, backwash water from the DeCew water treatment plant is being redirected to Moodie Lake instead of being discharged to Beaverdams Creek. Sedimentation sludge is being hauled to the sewage treatment plant.

Waterworks

Upgrading of water quality is under review in the villages of Arthur, Erin and Elora. A request for grant assistance has been received from Arthur and is expected from Erin and Elora.

Low-cost alternatives to provide some form of municipal supply have been stalled in the communities of New Dundee and Linwood due to a split in public opinion on the need.

Low-cost alternatives on Lynden and Sheffield water supplies are nearing completion. The design of the Lynden system is now under way by the Region of Hamilton-Wentworth and installation is planned for 1984. The Sheffield alternative is still under discussion by the Township of Flamborough.

At Niagara-on-the Lake, the controversial water supply from the Niagara River was replaced in 1982 by the DeCew Falls supply.

Routine water quality monitoring of the Niagara River revealed trace amounts of dioxin in two raw water supplies, Niagara Falls and St. Catharines. Subsequent to this finding, a dioxin action plan including extensive monitoring is being implemented.

As a result of continuing public concern about Niagara River water quality, a preliminary study on the removal of trace organic materials from Niagara Falls water was

completed by the water technology section. More intensive study involving pilot-scale work on granular activated carbon absorption was undertaken by a consultant retained by the federal and provincial governments.

Waste Management

An ongoing study in Waterloo Region is examining the feasibility of an energy-from-waste project in Kitchener to burn garbage to provide steam to B.F. Goodrich. The project would prolong the life of Waterloo Region's major landfill site in the City of Waterloo.

The first Ontario commercial installation of a methane gas recovery system was completed by the City of Kitchener. Bestpipe Co. is now receiving methane gas from a closed landfill site to provide fuel in its boilers for production of concrete pipes. Initial volumes of gas have been lower than expected, but this may increase in time.

Haldimand-Norfolk Region has retained consultants to evaluate its waste management systems and sites to prepare for environmental assessment hearings in proposed site changes and expansion program.

The Delhi landfill site is scheduled to close in 1985, followed by the North Walsingham site, then the South Walsingham site.

Intensive monitoring of leachate movement from the Beverly landfill site continues to ensure that no harm is being caused to nearby wells.

Studies on dioxin/furan emissions and combustion characteristics of the SWARU incinerator in Hamilton have been completed and the final report is expected in 1983.

The Regional Municipality of Niagara is conducting a regional waste management master plan study with the support of the Ministry. The study, undertaken by a consortium of three consulting firms, is expected to be completed next year.

As the result of several hydrogeological investigations by local municipalities, four landfill sites in Niagara Region affecting seven local municipalities, require major corrective measures and/or expansions.

Three-hundred-and-fifteen pleasure boats and 39 marinas were

inspected under the boating and marina program. Eight boats were found in violation.

Pesticides

- 109 permit applications were reviewed along with site inspections for restricted pesticide use.
- 170 pesticide-related complaints were investigated. Herbicide damage and drift of pesticides accounted for 35 per cent of these complaints.
- 59 man-days were spent on training and examination of applicants for exterminator licensing; 12 man-days were spent on the inspection of wholesale and retail pesticide vendors; 600 general inquiries relating to pesticides and the control of pests were handled.

Air Quality

The region's air quality monitoring network operated about 200 devices. The following special surveys were undertaken:

- General Abrasive Ltd., Niagara Falls — two one-week surveys with the new special surveys vehicle during shutdown and post-shutdown periods of the silicon carbide furnaces.
- Exolon Ltd., Thorold — one-week survey with the special surveys vehicle.
- Stelco, Nanticoke — hydrocarbon survey near coke ovens.
- Chemical Waste Management Ltd., Smithville — one-week PCB survey.
- Allanburg meteorological station — operation of portable aerovane to investigate suspected lower level telemetered wind speed data.
- Thorold Paper Mill — chlorine sampling.
- Upper Ottawa Landfill Site, Hamilton — hi-vol survey for the benefit of Upper Ottawa health study team.
- Columbia Carbon, Hamilton — size fractionating hi-vol survey.

There were 34 complaint investigations by the phytotoxicology section alleging vegetation damage due to industrial or other pollution emissions; 24 identified symptoms as being due to natural causes.

The Air Pollution Index in Hamilton reached or exceeded the advisory level of 32 twelve times, for a total of 206 hours. The maximum was 39. The APIs in Niagara Falls and St. Catharines did not reach the advisory level.

Water Resources

A supportive position was successfully defended for the proposed sewage locations for Drayton at a public hearing held under the OWR Act.

Studies at Nanticoke on Lake Erie were continued as were studies on the effects of stormwater and combined sewer overflows on Hamilton Harbor and Windermere Basin. A report on the water and sediments in Windermere Basin was released.

Water resources field work was completed for the environmental assessment of the Palmerston sewage works expansion.

A study of Aberfoyle Creek was continued as part of an existing and future water management problem due to excessive pumping of wells and wastewater discharge by Aberfoyle Fisheries and the dewatering of a gravel pit by Capital Paving. A report on the operation of five trout farms was released in co-operation with Southwestern Region.

Ninety water quality monitoring stations, eight automatic streamflow recording stations, 25 manual stations and 24 observation wells were maintained.

A total of 395 water taking permits were renewed. Of 49 new permits issued, 27 were for groundwater and 22 for surface water.

Forty-two groundwater quality and quantity problems were evaluated and about 750 water well records were verified.

The major ground/surface water study at Uniroyal Chemical in Elmira was continued to identify the extent of contamination and to determine the best method to control the spread

of contaminants from areas where waste has been deposited and from present operations. Two nearby closed municipal landfill sites were also studied to try to determine their impact on water resources of the area.

Support was provided to the Niagara River Improvement Team on water resources monitoring and water chemistry data compilation.

A new major groundwater interference problem was related to dewatering by Steetley Industries in the Township of West Flamborough. Steetley opened up and dewatered a new section of the quarry north of its existing operation, causing at least 20 wells to fail. Additional interference was anticipated.

About 650 requests for groundwater data, 140 for surface water data and 225 for fish contaminant data were answered. Fifteen fish kills were investigated and 12 marine construction evaluations were done.

Evaluations and follow-up studies were done on 25 landfill and waste sites, both municipal and industrial.

Environmental Planning

Staff reviewed five proposed official plans, four secondary planning documents, 61 proposed official plan amendments and four environmental assessment related documents and proposals.

Utility Operations

The region was responsible for the operation of 35 sewage treatment facilities and five water supply systems. The sewage treatment facilities consist of a variety of types ranging from lagoons to activated sludge plants with tertiary treatment.

Central Region

Director: G. Mierzynski

Industrial Abatement

Capital expenditure by industries for major abatement programs totalled \$15,960,000.

Staff responded to 4,310 complaints and 206 spills. Odor complaints from various sources represented the majority of problems.

The director issued four control orders and two formal approvals, which required companies to install specific equipment to improve the operation of their emissions. Several informal program approvals to achieve pollution abatement were negotiated.

The following represents the major pollution abatement activities in the region:

In the Junction Triangle of Toronto:

- Six industries were subjected to intensive abatement programs to address odor problems.
- A control order was issued to the Glidden Company and program approvals to Inmont and Nacan; the other three companies in the area carried out works to the Ministry's satisfaction through informal program approvals negotiations.
- Staff participated in the Mayor's Task Force which resulted in an alert plan being issued in four languages to neighborhood residents. It detailed how citizens should go about getting action on complaints and established a co-ordinated approach for action by the Ministry and municipal departments.
- Staff participated in the setting up of a health study by the Health Department, City of Toronto, for residents of the Junction Triangle area with 50 per cent provincial funding. An environmental liaison committee, with citizens, companies and government representatives, was agreed upon to establish communications and resolve the environmental problems.

The shutdown of the Shell refinery in Mississauga resulted in the development of Ministry draft guidelines for the shutdown of industrial operations and the rehabilitation of industrial sites. The objective guideline is to ensure minimum impact from industries on the environment and to ensure that only appropriate future uses will be made of such property.

Gulf Canada Ltd. has installed a major biological wastewater treatment plant at its Clarkson refinery at a cost of \$4 million. The plant will significantly reduce loadings of oils and phenols in effluent discharges to Lake Ontario.

Dorcan Ltd. has replaced a cupola furnace at its Orillia foundry with an electric or melting furnace incorporating new air emission control equipment. The cost was \$2.5 million.

Port Hope Council has formed an environmental advisory committee of citizens and councillors. The committee receives monitoring data from the Ministry and advises council on these matters. Ministry staff participate in the meetings.

Union Carbide Co. in Lindsay has developed a staged program to recycle waste, dispose of stored liquid wastes and de-water sludges by the installation of an evaporation crystallization unit which permits the recycling of ammonium compounds and the recovery of sodium sulphate. Several million gallons of strong chemical wastes that have been stored in lined ponds on company property will be recycled for plant use or pre-treated and discharged to the Lindsay sewage treatment plant. Sludges from the pre-treatment clarifier which were formerly disposed of at a local landfill site will now be de-watered in a two-stage system on company property and the solid wastes transported to a landfill site.

In the Toronto area, Canada Malting Co. Ltd. upgraded its dust collection facilities.

Gordon Young Ltd. improved its odor abatement program for rendering operations. Further work is being continued.

Bates Chemical Co. Ltd. completed spill containment facilities at its tank farm.

Toronto Riverdale Hospital converted its boilers to natural gas. North York General and East York

General Hospitals discontinued garbage incineration by the installation of compactors.

Banner Packing Ltd. installed a new odor control system.

J. T. Hepburn Co. Ltd. installed sand reclamation and improved storage.

An extensive surveillance program of existing and abandoned gravel pits in the Regional Municipalities of York and Durham was undertaken. It is aimed at ensuring sound rehabilitation programs and the prevention of unapproved waste disposal. These practices can have adverse impact on groundwater resources of the area. Clean-up of many sites was initiated and there are pending prosecutions.

Municipal and Private Abatement

In the Muskoka-Haliburton-Simcoe recreational area, 979 private sewage systems were inspected on Boshkung, Long, Little Dudmon, Neg-aunee, Lake of Bays, Muskoka and St. George lakes for the purpose of detecting and correcting faulty systems. In addition, staff made 2,707 inspections of private sewage systems with regard to regulating the installation of septic tank and holding facilities in the District of Muskoka.

At the end of 1982 a sewage project was completed in the Town of Huntsville, to serve the Hidden Valley area. The project opened the area for development and relieved the concerns of citizens with regard to water quality in area lakes.

Staff dealt with six private systems correction programs in the Town of Caledon at Alton, the Township of Scugog at Manchester and Greenbank, the Town of Pickering at Claremont, the Township of Smith at Bridgenorth, and the Town of Newcastle at Newtonville.

Staff made 1,078 inspections of communal water and sewage works. In the case of sewage works, 501 inspections were made of sites receiving processed organic waste (digested sludge) from sewage works. The thrust of the program was towards meeting new guidelines for utilizing the material as a soil conditioner.

During the year, 1,046 inspec-

tions were made of communal waste sites. A new site was opened to serve the Town of Huntsville, which permitted the closing of the old site which lacked capacity.

The Environmental Appeal Board ratified an agreement between parties involved in a hearing on the closing of York Sanitation Site No. 4 in Whitchurch-Stouffville. The closing plan required completion of the site by 1985. A limit has been placed on the area to be used and the quantity of waste to be received.

A total of \$101,000 was disbursed to 29 municipalities to make improvements to waste sites. They varied from fencing to facilities designed to prevent the off-site migration of methane gas.

Air Quality

The region maintained a network of 450 instruments to monitor air in 25 communities.

In Toronto, the significant improvements in air quality achieved during the 1970s were maintained.

The Toronto Air Pollution Index (API) exceeded the advisory level of 32 on four occasions. The maximum level reached was 54 on October 27, 1982.

The intensive lead monitoring program around secondary lead smelters and major lead users continued. Asbestos monitoring on an intermittent basis was carried out in Peterborough and Lindsay.

Radioactivity levels were monitored in the vicinity of the Pickering nuclear generating station and the Eldorado nuclear plant in Port Hope. Levels were generally similar to those monitored in downtown Toronto.

Fluoride surveys were continued around brick and glass plants in Toronto, Brampton and Mississauga.

Water Resources

The water quality monitoring program on Lake Simcoe continued. During the ice-free period, 11 lake stations, plus one on the lower Holland River, were sampled.

Staff conducted water quality assessments on Lakes Muskoka, Rosseau and Joseph within the

District Municipality of Muskoka. The Muskoka District Planning Unit, in cooperation with the region, carried out water quality assessments on an additional 34 lakes.

An overview water quality survey of the Nottawasaga River was conducted to identify problem areas which may require further study.

Water quality surveys were carried out on Mussleman's Lake and Lake St. George, and an aquatic macrophyte survey of Penetang Harbour was conducted.

Five investigations of possible water quality impairment related to industrial and municipal discharges and landfill sites were conducted.

The groundwater unit carried out environmental impact assessments of 10 abandoned, active or proposed municipal or industrial landfill sites and disposal sites. Complex and sensitive sites like Keele Valley (Maple Pits), Stouffville, Seymour Township, Regional Reclaimers Ltd. (Newcastle), are under ongoing assessment. Also investigated were 10 groundwater quantity and 85 quality interference problems (due to spills of hydrocarbons, other chemicals as well as to improper salt and road salt applications).

The region maintained stream water quality stations at 192 locations, as well as eight recording and 11 periodic streamflow stations, and 27 recording observation wells. The following conservation authorities assisted Ministry staff in the collection of water samples: Credit Valley, Halton Region, Metropolitan Toronto and Region and South Lake Simcoe.

Water Monitoring

Water quality stations (Assisted by MTRCA, Credit, Halton and SLSCA)	192
Streamflow	
Recording	8
Periodic	11
Observation wells	27
Self-help program	80
Water well location	
Records received	2,176
Records returned	1,486
Balance awaiting location	5,909

Utility Operations

The region provided water and/or sewage services to a population of 530,000 persons. An additional sewage treatment plant, under construction in the Township of Tay, will serve the village of Victoria Harbour and a portion of the township.

Approvals and Planning

Land-use plan review activities declined in the early part of the year, due to a decline in building activity. Environmental assessment activities increased over previous years, and a full-time environmental assessment co-ordinator was assigned. As well, the lakefill quality assurance program was established to monitor the quality of excavation material destined for use as lakefill in Lake Ontario.

The following outlines the review activities of the unit:

Plans of subdivision reviewed:	242
Official plans and amendments:	219
Quasi-approvals:	42
(Niagara Escarpment Commission, Parkway Belt applications, Minister's zoning orders, etc.)	

Seven major environmental assessments were reviewed, and 68 reports submitted under provisions of various class environmental assessments. Pre-submission consultations occurred on 25 projects.

Approvals staff issued 322 certificates of approval for industrial emissions to the atmosphere and nine certificates for emissions to water. Forty new permits to take water were processed, 51 previously issued permits renewed, and 29 letters of approval issued to authorize temporary water taking.

Southeastern Region

Director: R. E. Moore

Industrial Abatement

Regional staff investigated 603 complaints on environmental contamination and responded to 158 spills.

One control order was issued to Domtar Fine Papers requiring reduction in atmospheric emissions of chlorine, chlorine dioxide, and hydrogen sulphide, and reduction in suspended solids discharged to the St. Lawrence River.

A Section 42 order was served on O.E. MacDougall Liquids Waste Services and Systems Ltd. directing it to investigate leachate migration from a former waste disposal site property.

To upgrade emergency response preparedness, an emergency vehicle was outfitted with response and communications equipment. In addition, a comprehensive contingency plan, including nuclear contingencies, was developed for the region to replace individual district plans.

A co-ordinated provincial response with the ministries of Labour and Natural Resources was given to the proposed closeout approval plan of the Atomic Energy Control Board for the uranium mine operated by Madawaska Mines Ltd. at Bancroft.

A consultant was chosen to design and supervise corrective measures to remove/contain PCB contaminated soils in the vicinity of Lake Clear in Renfrew County.

Significant pollution abatement measures undertaken by industries in the region are the following:

- Phosphorus removal facilities were installed at Nestle Foods, Chesterville.
- An expansion of the lagoon system at Ault's Food, Winchester, resulted in a significant improvement in effluent quality.
- Pfizer Limited, Cornwall, began construction of an extended aeration effluent treatment system.
- Two Krofta clarifiers were installed at the Trent Valley

Paper Company to virtually eliminate any effluent discharge.

- Construction of a retention pond, berms, new leachate collection system and a new arsenic treatment plant at Deloro was effected at a cost of \$1.6 million.
- A \$400,000 baghouse was installed on the east side vacuum residue system at Chromasco, Hailey Station, reducing emissions by more than 99 per cent.
- A \$250,000 filter press was installed by E.B. Eddy at Ottawa to dewater sludge in the millwaste waters, completing its control order.

Municipal and Private Abatement

The section worked with the following programs/projects:

- The Town of Arnprior began a sewer separation program; total cost \$2.5 million; Ministry grant \$1.26 million.
- Construction began on the City of Pembroke water treatment plant; Ministry grant of \$2.4 million.
- Work started on the force main from Richmond (Township of Goulbourn) to the Regional Municipality of Ottawa-Carleton system; Ministry grant \$3.2 million.
- Replacing watermains and upgrading of the sewer system in Carleton Place commenced; Ministry grant \$2.0 million.
- Work continued on the Napanee area water and sewage projects. In early 1983 the expansion of the sewage treatment plant to secondary treatment with phosphorus removal became operational; Ministry grant \$1.5 million.
- A total of \$80,000 was provided under the waste management improvement program to upgrade 18 waste disposal sites.
- An area study for waste management for the Town of Rockland and the Township of Clarence was completed under a 50 per cent grant. The report is being reviewed.

- An Environmental Assessment Board hearing under the EPA was held for the City of Cornwall's new waste disposal site and the board recommended approval. Final design of the site is in progress. \$2 million was spent on 43 water and sewage projects under the private services funding program and a further 34 projects were approved for study.
- Approximately 1,000 complaints were investigated.
- There was an increase of 55 per cent in applications (800) for approval of private sewage systems along with a substantial number of requests for severances in the Ottawa area.
- In late 1982 a number of wells in the Lanark area were contaminated as a result of the Ontario Hydro fall herbicide spray program. The wells have recovered or are recovering.
- The demand for structural permits to control bats in dwellings in the Ottawa area remains high.

Air Quality

Highlights for this unit included:

- Sulphur dioxide (SO₂) monitoring at Hawkesbury was discontinued with the cessation of operations at Canadian International Paper.
- A trailer station for TRS monitoring was established near Courtaulds in the east end of Cornwall to complement the TRS monitor in the west end near Domtar.

Water Quality

Groundwater assessment staff carried out 51 groundwater contamination and 14 groundwater interference complaint investigations and completed assessments of the groundwater implications of 35 landfill, eight lagoon, 15 quarry and 52 sludge utilization sites. Office reviews and comments were completed on 133 planning documents pertaining to the region's groundwater resource. Ten water well level records

were maintained.

Surface water assessment staff maintained water quality monitoring stations at 93 stream locations and on 79 lakes. Fifteen lakes were sampled in conjunction with the APIOS program. Thirty-nine water quality studies were undertaken to determine the impact of point source and leachate waste inputs to surface waters.

Reviews and comments were completed on 86 nearshore dredging and/or filling projects, 21 municipal services and five industrial waste treatment projects, 24 water taking permits and 38 agricultural drainage projects.

Utility Operations

The region operated 43 sewage projects, serving a population of 194,900, and 24 water projects serving a population of 56,800.

Approvals and Planning

This unit examined 85 official plans and amendments, 533 zoning by-laws, 95 subdivision plans, 14 consent applications. 139 applications for regional approval under Ontario's environmental legislation, 161 applications for head office approval under environmental legislation, 165 applications related to programs of other agencies and 108 environmental assessment documents.

The unit also monitored the Trans Canada Pipe Lines North Bay shortcut construction project, the environmental assessment for the Hwy. 416 corridor project, various land use planning projects, and Sutcliffe, Tricil and City of Kingston waste management and sludge activities.

A mobile air monitoring van has been obtained from Air Resources Branch and is being refurbished and provided with continuous monitors for SO₂ and oxidants. This vehicle will be based in Kingston, but will be available for spot surveys in other areas.

There was technical input into a new telemetry system and to electronic data processing systems in general.

Laboratory Services

The Kingston regional laboratory performed the same number of chemistry tests as in 1981/82 (106,000), and an increased number of microbiological tests (60,000).

The microbiology workload is predominantly drinking water supplies (with special investigative projects Aeromonas in Belleville) on problem systems.

Increased analytical support is being provided for landfill monitoring and for Ministry of Health programs such as prenatal and dental care.

Environmental Approvals and Project Engineering Branch

Director: C.E. McIntyre

Approvals functions of the former Environmental Approvals Branch and engineering expertise from the Project Co-ordination Branch were consolidated within one branch to enhance the Ministry's "one window approach" and permit a more effective use of staff.

The Environmental Approvals and Project Engineering Branch is now responsible for the review and processing of applications required under the Environmental Protection Act and the Ontario Water Resources Act. It is also responsible for promoting consideration of the environment in land use policies and programs, and for encouraging development of water supply and sewage treatment infrastructure through the provision of engineering and construction assistance to municipalities.

Approvals Section

Municipal and Private Approvals Unit

The unit processed 878 water-works applications at a cost of \$190 million and 1,152 sewage works applications at a cost of \$327 million.

Industrial Approvals Unit

This section receives and processes industrial applications for the approval and control of facilities for contaminant discharges into the natural environment. The following chart summarizes this activity for 1982/83:

	Applications Processed			
	Received	Approved	Cancelled	Denied
Air	523	454	54	1
Water	91	70	29	1
Waste	0	0	0	0
Total	614	524	83	2

Waste Sites and Systems Unit

This unit processed 59 applications for waste management sites and 191 applications for waste management systems.

Staff participated in numerous meetings, technical evaluation and discussions with site owners, operators and multi-disciplinary consultants, the public and government agencies to assist in resolving technical and legal conditions for the certificate of approval for the Maple and Ridge landfill sites. In addition, there was extensive participation in negotiations to reach consent of all parties covering the interim operation and ultimate closing of the Whitchurch-Stouffville landfill site.

Project Engineering Section

The project engineering section

handled 107 construction contracts and administered a capital expenditure of \$72.2 million (see Table I). Of this amount, 30.6 per cent was paid out as subsidies under the Ministry's construction program for municipalities. In addition, the branch is responsible for the administration and budgeting of the Ministry's:

- Direct grant program for providing grants to assist the construction of municipally-owned water and sewage facilities (1982/83 expenditure \$56.4 million).
- The grant program for repair and renewal of private sewage and water systems in small communities (1982/83 expenditure \$4.7 million).
- Direct grant program under the joint job creation program of

the Ministry and the Board of Industrial Leadership and Development (BILD) for providing grants to assist the construction of municipally-owned water and sewage facilities (1982/83 expenditure \$3.4 million).

- Canada-Ontario Agreement Sewerage Program (COASP) for providing grants to assist the construction of sewerage facilities in the Great Lakes basin (1982/83 expenditure \$35.0 million).

Central Ontario Projects

The construction of the water supply works for the community of Keswick, valued at \$3.9 million, continued. The intake pipe to Lake Simcoe was completed and the treatment plant was approaching completion at year-end.

The water supply works for the Town of Wasaga Beach were placed

TABLE I
Volume of Activity Under Capital Construction Program
1982/83

1. Capital Expenditure		\$72,233,000
Sewage works		\$58,863,000
Waterworks		\$13,370,000
Provincial projects		\$71,323,000
Municipal projects		\$ 910,000
Provincial subsidy		\$22,133,000
% of total expenditure		30.64%
2. Construction — Ministry projects		
Contracts tendered	— Number	40
	— Value	\$47,003,000
Contracts started	— Number	43
	— Value	\$44,923,000
Contracts completed	— Number	42
	— Value	\$63,642,000
Contracts under construction during the year		107
Average number of contracts under construction in each month		43
3. Construction — project management (Direct grant)		
Contracts tendered	— Number	26
	— Value	\$16,693,000
Contracts started	— Number	32
	— Value	\$19,125,000
Contracts completed	— Number	18
	— Value	\$10,756,000
Contracts under construction during the year		36
Average number of contracts under construction in each month		15

TABLE II
Grants to Municipalities for Sewage Works and Waterworks
1982/83

1. MBR Priority Evaluations		
a) Direct grant programs requests		52
— Ruled eligible		25
— Rejected		27
b) Private systems program requests		23
— Ruled eligible		20
— Rejected		3
Total evaluated		75
2. Direct grant program payments		\$56,379,000
(15 — 75% grants)		
3. B.I.L.D. grant program payments		\$ 3,436,747
(15% grants)		
4. Private systems grant program payments		\$ 4,687,000
(75% grants)		
5. Federal COASP grant payments		\$35,000,000

operation in June. An elevated water storage tank and connecting watermain are the only works program funded by the Ministry of Natural Resources. The remaining works are to be completed in 1983.

The sewage treatment plant and six sewage pumping stations for the village of Bobcaygeon were completed and the sewage system placed in operation. These works were the cost of a \$15.5 million water and sewage works program for the village.

Northern Ontario Projects

Projects in Northern Ontario continued to receive financial assistance from the Ministry of Northern Affairs to accelerate infrastructure development. Approximately \$3.3 million was provided by Northern Affairs for direct administration by the branch to assist 20 of these projects.

Two subsidy agreements under the general development agreement of the Department of Regional Economic Expansion/Regional Priority Budget program continued to be administered by management committee which includes representatives from DREE, the Ministry of Northern Affairs and the branch project supervisor for the particular region.

The Northwestern Management Committee administers a \$50.8 million program that includes sewage improvements in Thunder Bay and Grace.

The Northeastern Management Committee administers a \$30 million program that includes services for industrial parks in Parry Sound, Sudbury and North Bay, as well as infrastructure in Timmins. The DREE/RPB program also included expenditures for infrastructure projects for single-industry communities such as Nakina, Longlac, Geraldton, White River and Hornepayne.

York-Durham Projects

During the year, \$19.5 million was spent on the York-Durham sewage system. The extension to Woodbridge was almost completed and final pumping stations in

Newmarket and Aurora commenced. Final pipeline contracts in the system were awarded and began in the Aurora/Newmarket area.

At the Duffin Creek plant, the final major contracts involving the computer control system got under way.

More than \$3.3 million was spent on the York Water System which was basically completed.

Value Engineering

Value Engineering, formerly the design and equipment section, received and evaluated for approval purposes design submissions received from consulting engineers for sewage and water projects. The submissions were evaluated from the viewpoint of sanitary engineering and cost-effectiveness, including energy utilization and conservation.

The section processed 96 submissions including major sewage and water projects in the South Peel Region, York Durham Area and Haldimand-Norfolk Region.

In addition, guidelines and standard specifications were designed for equipment.

Project Procedures and Control

This section develops, updates and implements criteria for the Ministry grant program. It also monitors expenditures for direct grant projects and provincial programs for sewage works and waterworks and advises on the scheduling of contracts to meet budget requirements. (See Tables I and II at the end of this section and Graphs I and IV in Appendices.)

Special Activities Section

Special Engineering, Design and Equipment

This unit investigates and develops solutions for unusual construction problems, prequalifies concrete sewer pipe plants, evaluates new products and develops technical

guidelines, standards, and specifications for waterworks systems, equipment and construction.

Technical specialists are available to inspect new and operational sewage works and to advise on designs for new works and to carry out maintenance audits on Ministry plants.

Investigations of elevated water storage tanks built under Ministry projects were carried out and four tanks repaired. Interim water supply was provided to small communities during repair work. A survey of the condition of municipally-built concrete tanks was also completed. A total of 64 field inspections were made of Ministry water and sewage works projects.

The mechanical/electrical/instrumentation specialists made 678 field visits to water and sewage works projects.

Operational Services Group

The land-use group issued new, revised chapters to the Ministry's Land Use Plan Review Handbook, conducted seminars on land-use planning and prepared a new Municipal Environmental Planning Series publication to inform municipalities of land use planning.

In addition, the group participated in a water distribution and sewage renovation study for Ontario and in governmental committees and task forces on land-use related matters.

Noise Assessment Group

Expertise was provided to regional offices and municipalities in evaluating about 500 land-use proposals and development applications with respect to noise and vibration impacts and assisted in the investigation of noise and vibration complaints.

Private Sewage Group

This group examined new methods for delivering the private sewage program and revised the Manual of Policy, Procedures and

Guidelines for Private Sewage Disposal Systems to conform with metric standards.

Claims, Contracts and Engineering Audit

This unit reviews disputed claims and assists in settlements, arbitration or litigation arising from claims made in relation to water and sewage works projects financed or managed by the Ministry. In addition, the unit received tenders for construction for Ministry-managed water and sewer projects and provides engineering evaluations and inspections for Ministry-managed projects.

There were 67 tender calls for water or sewage projects and audits were carried out for 176 claims for grants.

Special Investigation Unit

Chairman, Supervisors Committee:
M. G. McKenney

The Special Investigation Unit (SIU) began operations on January 19, 1981. The second full fiscal year of activities ended March 31, 1983.

Through the last report period, the SIU was composed of 13 permanent members: six supervisors, seven officers. All staff participate in enforcement activities.

Originally, the unit was to focus upon liquid industrial waste practices and in particular the waybill regulations. Moreover, the unit was to be an enforcement group which would co-ordinate and facilitate investigations, prosecutions, and the development of legal means of achieving abatement.

By the end of the second full year of operation, it had developed into a cohesive enforcement group. Staff had advanced significant initiatives in many areas of enforcement, and made the transition from abatement personnel to that of enforcement officers.

In co-operation with the Ontario Police College course at Aylmer, the SIU developed an improved Crown Counsel Brief form. These forms now commonly accompany requests to proceed with prosecutions and have been endorsed by Legal Services Branch.

The unit, in conjunction with Legal Services Branch, presented to senior management of the Ministry a proposal to streamline prosecution approvals. Subsequently, several hundred minor infractions of our legislation were "short-worded", thus allowing Provincial Offences Act "tickets" to be issued.

The ticketing program has proceeded cautiously as Provincial Officers are careful to assert their discretionary powers to lay charges. However, activity appeared to be increasing as fiscal 1982/83 ended. Included in this policy alteration was the ability for regional directors to authorize certain prosecutions, in concert with Legal Services Branch, where fines sought were less than \$1,000.

As a spin-off of the Provincial Offences Act ticket program the SIU became involved in liaisons with boards of health. Individual health units administer Part VII of the Environmental Protection Act. Unit staff took part in training seminars for 15 health units. Further, staff, in co-operation with Legal Services Branch, co-ordinated the issuance of an improved identification package to designated health inspectors who are Provincial Officers under Part VII.

In addition to training health units in the intricacies of the Provincial Offences Act, staff initiated seminars for Ministry staff in each region. Forty-three legal training seminars were conducted.

The unit's activities have expanded to include a variety of other enforcement activities in the following fields:

- | | |
|-------------------|----------------------|
| — steel | — minerals |
| — oil | — pulp and paper |
| — construction | — municipal water |
| — waste disposal | — municipal wastes |
| — paint | — municipal sewage |
| — automotive | — Federal facilities |
| — liquid wastes | — smelting |
| — forest products | — pipelines |
| — pesticides | — gravel |
| — transportation | — operations |
| — shipping | |
| — agriculture | |

The SIU was involved in over 600 investigations (Table 1). Of these, 62 cases were brought to court, resulting in 259 separate charges. Some \$91,000 in fines resulted.

Statistics relating convictions directly to the number of charges laid can be misleading. The practice of proceeding with multiple charges, and then withdrawing some, complicates the analysis of litigation results. As described in Table 1, when withdrawals are eliminated from the analysis it can be seen that the success rate in charges handled by the unit was nearly 80 per cent.

The SIU has taken on a role of co-ordinating many court-related administrative duties within the regions. During 1982/83 it is estimated that more than 100 man-days of court appearances were made by unit staff.

The service of summonses and subpoenas and the swearing of information have also become roles often referred to SIU staff. During the report period, 328 summonses were served along with 161 subpoenas to witnesses. In addition, 11 search warrants were obtained and evidence seized.

An essential aspect of the unit's work is developing a rapport with other enforcement agencies. During fiscal 1982/83 the following groups were contacted, assisted, or asked for assistance: Fuel Safety Branch, Ministry of Consumer and Commercial Relations; U.S. Customs; Canada Customs; Ministry of Labour; Ministry of Health; Environment Canada; Revenue Canada; municipal police departments; New York Department of Environmental Conservation; Michigan Department of Natural Resources; Ontario Ministry of the Attorney-General; Ministry of the Solicitor-General (Fire Marshal's Office); court administration; Ministry of Natural Resources; OPP; RCMP; Ministry of Transportation and Communications; Department of Transport; Department of National Defence; Environment Alberta; Pennsylvania Department of Environmental Conservation; New Jersey Department of Attorney-General; New Jersey Department of Environmental Control; Massachusetts Environmental Control Board.

S.I.U. Activities – Fiscal 1982/83

Table 1

Prosecution activity (Cases begun 1982/83)

	Charges	Convictions	Dismissals	Withdrawals	Fines
Central	40	28	6	6	\$30,000
West-Central	23	13	10	0	\$ 4,000
Southwestern	52	21	1	30	\$17,000
Southeastern	20	15	0	5	\$ 5,520
Northwestern	13	7	2	4	\$15,306
Northeastern	111	57	19	35	\$19,641
Totals	259	141	38	80	\$91,467

Table 2

Investigation activities (SIU Lead and Support)

Central	110	Southwest	190	Northwest	109
West Central	88	Southeast	78	Northeast	84
Total	659				

Table 3

Involvement in abatement controls

Central		Southeastern	
Provincial Officer demands	43*	Part V orders	6
Part V orders	4	Minister's orders	3
	<u>47</u>	Water Resources	<u>2</u>
			11
West Central		Southwestern	
Part V orders	4	Control orders	3
Minister's orders	3	Minister's orders (S16)	1
	<u>7</u>	Part V orders	<u>2</u>
			6
Northwestern		Northeastern	
Part V orders (S41)	2	Part V orders (S42)	1
Minister's orders (S16)	2	Control orders	5
Water Resources	1	Water permits	1
	<u>5</u>	Part VII orders	<u>52</u>
			59
Total	135*		

Table 4

Training seminars offered (Health units and MOE)

Central	8	Southwest	14	Northwest	4
West Central	2	Southeast	8	Northeast	7
Total	43				

Does not include Provincial Officer demands (S127)

finance and administration division

Executive Director: G. E. Higham

This division provides a complete range of support services and control functions to the operating divisions required for the efficient operation of the Ministry.

It also manages the finances of the Ministry's water and sewage works.

Accounts Branch

Director: W. D. Wood

The accounts branch is responsible for the co-ordination of the financial management function of the Ministry and its related agencies, boards and commissions.

The branch carries out its responsibilities by ensuring systems and policies are in place to support program objectives and ensure compliance with central agency policies and guidelines.

The branch financial systems are designed to ensure integrity of financial data and meet central agency reporting requirements as well as to aid managers in the effective management of financial resources. Branch staff assist program managers by providing financial analysis and evaluation for in-year monitoring and control of budgetary performance.

Capital Financing and Revenue Branch

Director: C. D. Mialkowski

The role of this branch is to provide financial management for the capital and grant programs and to control the receipt of revenues.

Water and Sewage Works

Financial management was provided for 774 projects under agreements with municipalities and industry. The following is an analysis of the financing of 485 term loan agreements and 289 provincially-owned works under service agreements.

Investment in water and sewage works as of March 31, 1983 (At cost less recoveries)

	\$ Millions
Term loan agreements	
Waterworks	38.5
Sewage works	51.3
	<hr/> 89.8
Service agreements	
Waterworks	318.9
Sewage works	712.6
	<hr/> 1,031.5
Total Investment	<hr/> 1,121.3

In most cases, the water and sewage plants were also operated by the Ministry. The total plant operations expenditures for the fiscal year amounted to \$62.2 million. The statutory and contractual activities in this area include: setting service rates (104 in 1982/83); maintenance of accounting records, the reporting of financial aspects of various water and sewage projects as required by agreements and legislation; assisting municipalities in implementing billing and collection procedures under various service and term agreements and assisting them in by-law reviews when requested. Gross revenue generated by these activities in 1982/83 amounted to \$103.7 million.

Cost Sharing Agreements And Grants

Administration of claims under Canada/Ontario cost-sharing agreements resulted in reimbursements of expenditures of \$35.0 million under the sewage facilities construction program and \$0.8 million under the Great Lakes surveillance program.

Provincial assistance on projects under service agreements amounted to \$46.1 million and grants to municipalities amounted to \$67 million.

During the year, the branch was active in the development of revisions to the Ontario Water Resources Act to permit annual water and sewage service rate reviews on provincial projects and to recover costs on these projects on a basis other than a gallonage basis.

Management Audit Branch

Director: E. F. Heath

The Management Audit Branch is a central support function responsible for providing management with assurance that control processes are satisfactory with respect to efficiency, economy and effectiveness or that improvements are necessary. These control processes encompass both financial and management controls under which Ministry programs and activities are administered.

With the introduction of the comprehensive auditing concept, approved by the central agencies in late 1980, the branch has embarked on a program to develop and implement this approach.

In order to cope with the added responsibility and more complex work load, staff was increased from seven to nine during the year and three more are expected to join the branch in July 1983.

The branch has performed some 180 audits on three grant programs, the Canada Ontario Agreement Sewage Program (COASP), the Up-Front or Direct Grant program and the Private Systems Grant program. The amount of construction cost on the claims audited for the fiscal year was \$229.3 million.

Human Resources and Personnel Development Branch

Director: R. E. B. Burns

This branch assists and advises on all aspects of personnel management and development.

The branch held two career development assessment centres for non-professional staff. With the assistance of staff from the Ministry and from other ministries, candidate were assessed on their performance in a simulated role.

Within the program to enhance the management capabilities of staff the branch conducted eight classification grievance workshops, five position specification writing workshops as well as two management development courses.

The training and certification section ran 52 technical courses for 491 Ministry staff and 647 non-Ministry staff. Included were 116 students from industry, 20 from out of the province and seven from outside Canada.

The number of employees in the computerized manpower planning inventory was increased. This now allows employees to identify their career aspirations in a manner which enables management of the Ministry to plan future staffing activity.

Work commenced on the development of an attendance improvement program. The full program will be implemented in 1983/84.

Office of Administrative Services

Manager: A. E. Robinson

This office provides purchasing, accommodation, records management, printing, and office support services to this Ministry, and ensures compliance with government administrative policies and procedures.

The purchasing section is responsible for the purchase of all supplies, equipment, and services totalling approximately \$47 million.

During the year, the major task of the accommodation section was co-ordinating the consolidation of various branches and sections of the Ministry which were affected by the re-organization in 1982/83.

This office also provides assistance to Ministry clients in the administration of such records management programs as the retention and disposal of records, the design, procurement and distribution of Ministry forms, the feasibility of acquiring microfilm and word processing equipment.

This office co-ordinates the acquisition of printing services for Ministry clients in the most economical and efficient manner either through in-house facilities or outside vendors.

Systems Development Office

Manager: G. Scanlon

The role of this office is to provide developmental and operating support for the Ministry's computerized information systems.

Following is a brief summary of some of the projects:

- The feasibility study of the new air quality telemetry system involving the acquisition of computer equipment, software, data loggers and telecommunication facilities and services was completed.
- The feasibility study on the new industrial waste waybill system involving the acquisition of computer equipment and software was completed.
- The development of the waste information system was completed. The entering of field data and approvals data describing waste sites began.
- A second HP3000 computer was acquired for the Laboratory Information System (LIS) to act as an input/output processor in order to improve sample submission processing, system response times and report turnaround. Implemen-

tation of the first Direct Computer Input (DCI) application was completed involving eight micro computers, resulting in a significant reduction in time spent by technicians entering results data.

- The acquisition of a computer system for the Northeastern regional office in Sudbury and district offices in North Bay, Timmins and Sault Ste. Marie was completed. The regionalization of four of the six systems selected in the Regional Distributed Data Processing System (RDDPS) was completed:
 - Sample Information System (SIS)
 - Air Quality Information System (AQIS)
 - Industrial Monitoring Information System (IMIS)
 - Industrial liquid waste waybill system
- The development of the Industrial Monitoring Information System (IMIS) was completed. The entering of data and the build-up of master files will take place in the new fiscal year.

The system operations section was involved in processing approximately 30,000 jobs and providing information centre services such as training for users in retrieval languages and the use of statistical packages.

boards and committees

The Environmental Assessment Board

Chairman: B. E. Smith

The Environmental Assessment Board is an independent administrative tribunal which reports to the Legislature through the Minister. It conducts public hearings on environmental issues under the following legislation (the number of hearings which took place during the 1982/83 fiscal year being indicated after each act in parenthesis):

The Ontario Water Resources Act (15)

The Environmental Protection Act (7)

The Environmental Assessment Act (1)

The Consolidated Hearings Act (8)

Following hearings held under the former two pieces of legislation, the board forwards a recommendation with respect to the hearing to the director of Environmental Approvals and Project Engineering Branch. Under the latter two pieces of legislation the board issues a decision (the issuing of such decision under the Consolidated Hearings Act being in conjunction with the Ontario Municipal Board).

At the end of 1982/83, the board had 18 members, four of whom, including the chairman, are full-time members.

The board publishes its own annual report which is available from the board's office at 1 St. Clair Avenue West, Fifth Floor, Toronto, M4V 1K7. (Telephone: 416/965-2531).

The Environmental Appeal Board

Chairman: L. C. De Groot

The Environmental Appeal Board is an independent administrative tribunal which reports to the Legislature through the Minister. Established under the Environmental Protection Act, it provides an appeal mechanism for persons affected by certain decisions made by the Ministry or by local health units. The board consists of 13 part-time members, including the chairman, appointed from various parts of the province, and different occupations.

In 1982/83, the board received 37 appeals. Approximately 38 per cent concerned decisions of local health units on private sewage systems. The remaining appeals resulted from Ministry decisions regarding waste disposal sites, waste management systems, private sewage systems, waterworks and air pollution control.

The board held 33 days of hearings. It resolved 27 of the appeals received during the year as well as nine appeals from the previous year. Two appeals from the previous year remain in abeyance. At year-end, decisions remained to be issued, or hearings held, on 10 appeals.

The Pesticides Advisory Committee

Chairman: Dr. G. S. Cooper

Established under The Pesticides Act, 1970, the Pesticides Advisory Committee annually reviews the act, its regulations and government publications concerning pests and pesticides. The committee also enquires into matters concerning pesticides and the control of pests as deemed necessary or as prescribed by the act and regulations.

The committee recommended several minor changes to Ontario Regulation 751, evaluated the environmental impact, toxicity and hazard of three new pesticide active ingredients and 210 newly registered pesticide products including 74 fertilizer products containing pesticides, and recommended for each a classification for storage, sale and use. Seven obsolete products declared by the registrants to be no longer available were recommended for removal from the active list of scheduled products. The Ontario guidelines for classification of pesticide products were updated in May 1982.

The committee continued a research program established in 1973 with three major objectives:

- To find alternative pesticides for those deemed environmentally hazardous and those restricted in use.
- To determine potential environmental hazards with pesticides currently in use.
- To reduce pesticide input into the environment.

Forty-six research proposals were received, of which 28 were funded by the Ministry at a cost of \$296,625. A two-day research symposium was held in January 1983 at which grant recipients reported on their findings. An annual research report is published.

Seventeen committee meetings were held and scientific reviews were carried out. The following reports were released:

- A Scientific Update On the Current Status Of Tordon (Picloram) Herbicide

- Carbaryl — An Overview
 - Paraquat — An Overview
 - Acephate and Methamidop
- All provincial publications dealing with pesticides were reviewed.

Farm Pollution Advisory Committee

Chairman: O. Crone

Consisting of four farmers, this committee provides objective assessments of farm environmental situations as requested by Ministry officials. The committee visits farms to investigate complaints and make recommendations concerning manure storage and spreading, cultivation, yard drainage and ventilation of livestock and poultry buildings.

In 1982, the committee investigated three cattle feed lots.

Ontario Waste Management Corporation

Chairman and President:
D. A. Chant

The Ontario Waste Management Corporation (OWMC), established as a Crown agency in July 1981, reports to the Legislature through the Minister of the Environment. The corporation's prime responsibility is to design, construct and operate a province-wide system for the treatment and disposal of liquid industrial waste and hazardous waste, and to develop a long-term program to assist in the reduction and recycling of such wastes.

Two phases were completed of a five-phase facilities development process, designed to prepare detailed proposals on appropriate technologies and sites for a liquid industrial waste system. In September 1982, a Phase 1 Report was issued, containing estimates on the amount, type and location of liquid industrial waste produced in Ontario; information on appropriate world-wide treatment technologies; and important geological/hydrogeological, environmental, engineering and land-use information required to begin assessing treatment and location options.

In January 1983, a Phase 2 Report was issued, containing a refinement of data collected during Phase 1, preliminary planning guidelines on the type of system to be developed, the selected geological region where the search for suitable sites would be concentrated, and a proposed methodology for site selection.

OWMC officials held 225 meetings with groups, individuals and associations to discuss the Phase 1 and 2 Reports. Meetings were held in Sarnia, Chatham, London, Hamilton, St. Catharines, Oshawa, Richmond Hill, Brampton and Toronto, where 76 groups and individuals discussed the two reports with OWMC officials.

Seminars were also scheduled to discuss planning issues in more detail; six one-day conferences were scheduled throughout Southern Ontario for municipal officials in conjunction with the Association of Municipalities of Ontario, and a weekend meeting was held in February with representatives from 25

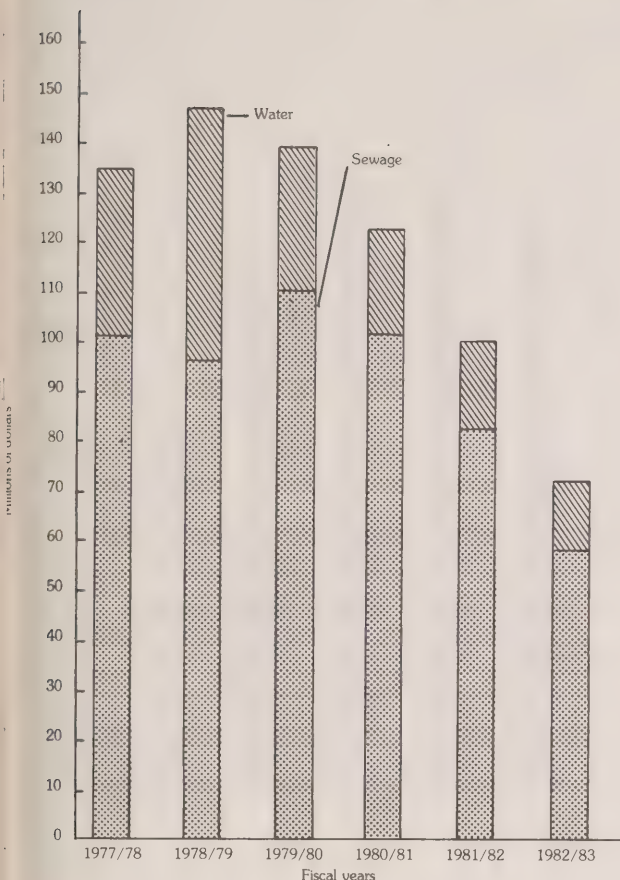
associations to discuss the site selection process.

The OWMC submits an annual report to the Minister of the Environment dealing with its activities which is available through the agency's offices at 2 Bloor St. East, Toronto, M4W 3E2.

appendices

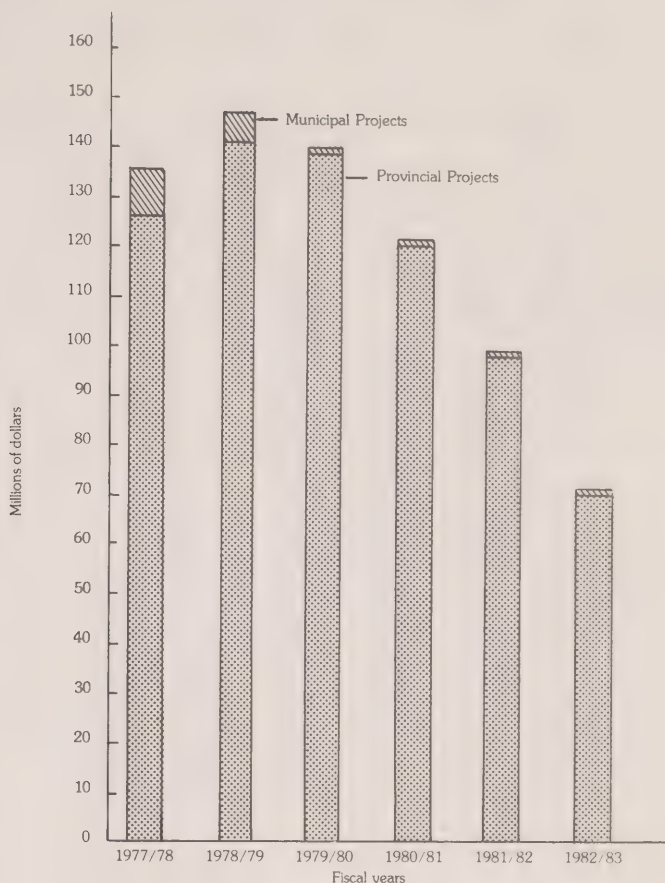
CAPITAL CONSTRUCTION PROGRAM

**Annual Total Expenditure by Project Type
(1977/78 – 1982/83)**



Graph 1

**Annual Total Expenditure by Class
(1977/78 – 1982/83)**



Graph 2

Annual Total Expenditure by Project Type

Fiscal Year	Sewage	Water	Total* (\$ Millions)
1972/73	54.4	26.0	80.4
73/74	68.4	13.1	81.5
74/75	94.8	32.0	126.8
75/76	114.8	40.1	154.9
76/77	114.8	31.2	146.0
77/78	101.0	34.1	135.1
78/79	96.6	50.7	147.3
79/80	110.6	28.9	139.5
80/81	101.9	21.7	123.6
81/82	82.9	16.6	99.5
82/83	58.8	13.4	72.2

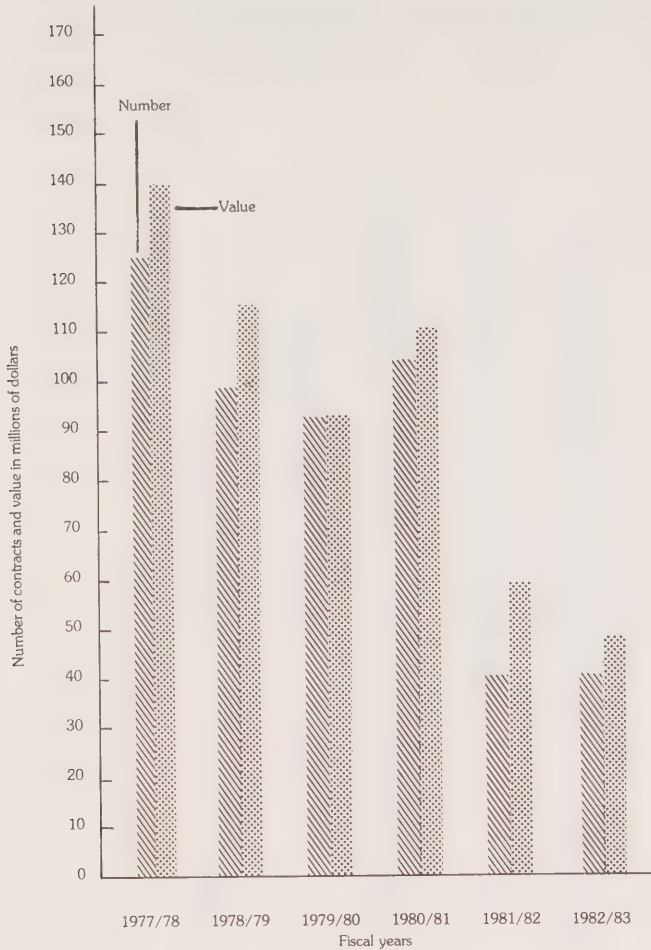
Annual Total Expenditure by Class

Fiscal Year	Provincial Projects	Municipal Projects	Total* (\$ Millions)
1972/73	77.6	2.8	80.4
73/74	75.5	6.0	81.5
74/75	115.4	11.4	126.8
75/76	145.2	9.7	154.9
76/77	131.8	14.2	146.0
77/78	127.0	8.1	135.1
78/79	142.9	4.4	147.3
79/80	138.3	1.2	139.5
80/81	121.7	1.9	123.6
81/82	98.0	1.5	99.5
82/83	71.3	0.9	72.2

includes costs of engineering, property and miscellaneous items as well as contract prices.

CAPITAL CONSTRUCTION PROGRAM

**Number and Value of Contracts Tendered Annually
(1977/78 – 1982/83)**

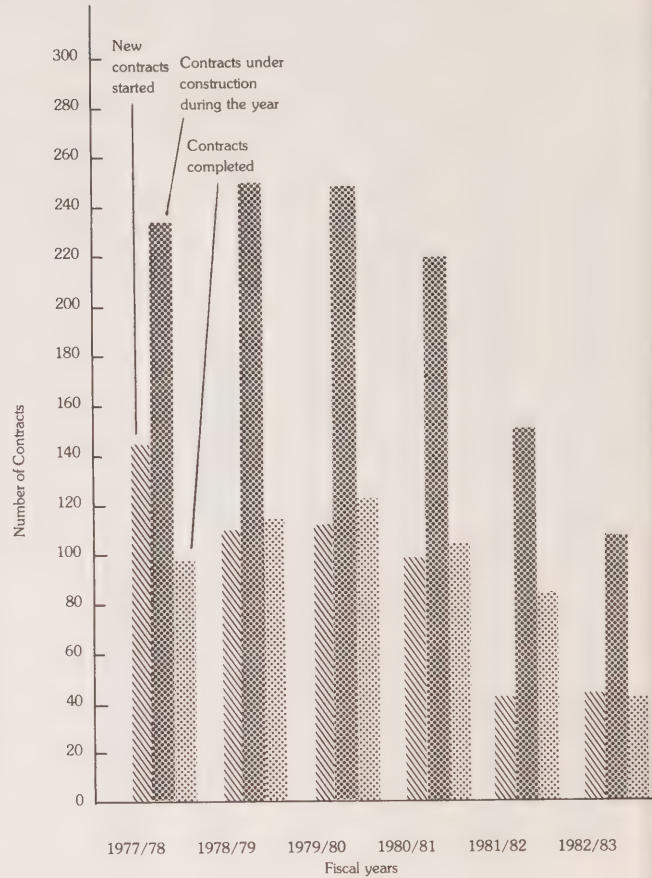


Graph 3

**Number and Value of Contracts
Tendered Annually**

Fiscal Year	Number	Value (\$ Millions)
1972/73	99	72.4
73/74	108	91.3
74/75	92	84.1
75/76	153	167.6
76/77	84	79.6
77/78	125	140.5
78/79	99	116.3
79/80	93	93.0
80/81	104	110.2
81/82	40	58.7
82/83	40	47.0

**Annual Volume of Activity
(1977/78 – 1982/83)**

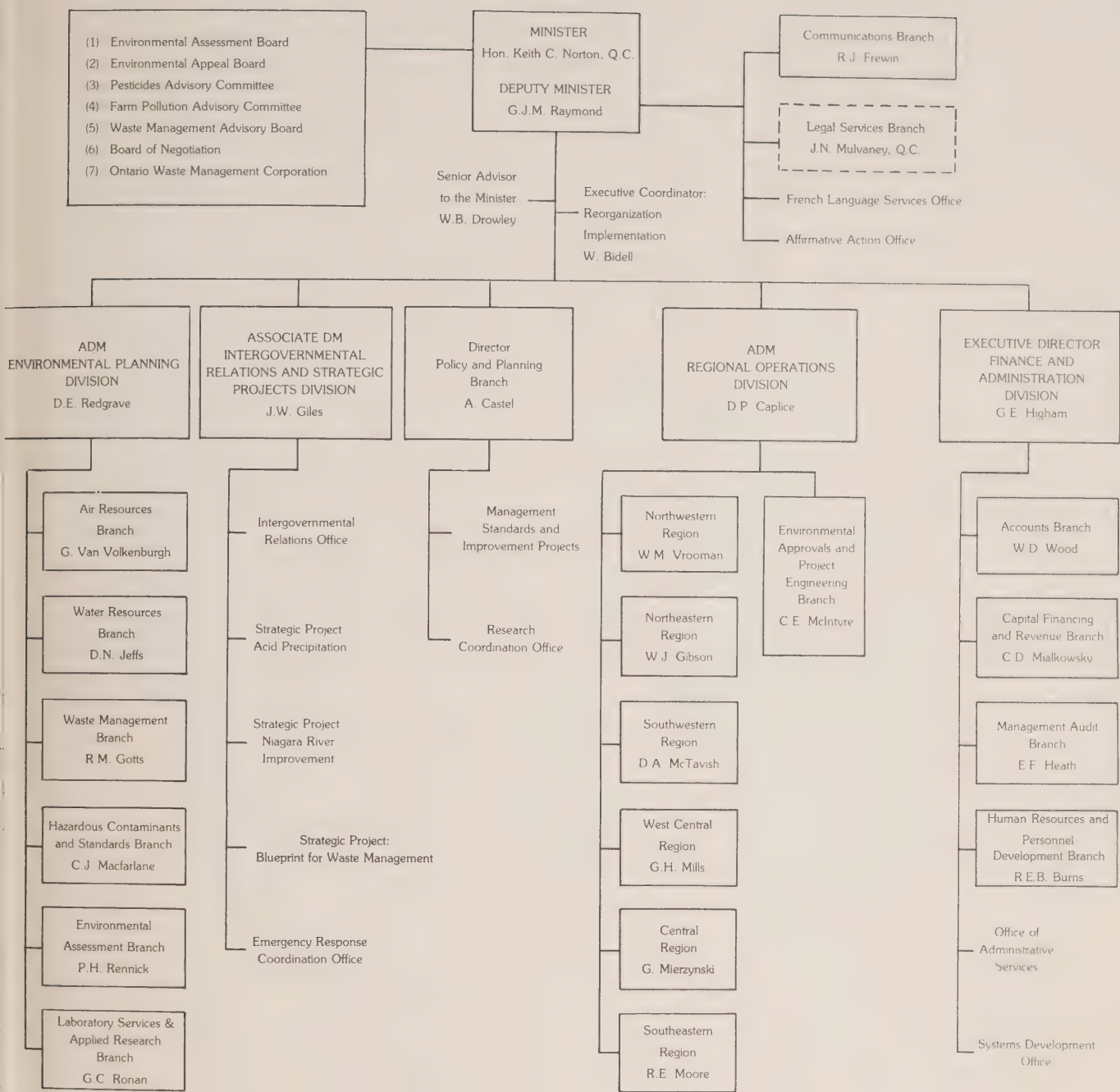


Graph 4

**Annual Volume of Activity
(Number of Contracts)**

Fiscal Year	Started	Under Construc- tion	Completed
1972/73	88	166	92
73/74	108	182	82
74/75	102	202	93
75/76	153	262	139
76/77	92	215	124
77/78	145	236	96
78/79	109	249	115
79/80	110	244	122
80/81	97	219	113
81/82	43	149	85
82/83	43	107	42

MINISTRY OF THE ENVIRONMENT — 1983*



*For Organization Chart, 1984 see inside front cover

ONTARIO MINISTRY OF THE ENVIRONMENT ANNUAL REPORT 1983-1984

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Ministry
of the
Environment

Hon. Andrew S. Brandt
Minister

Dr. Allan E. Dyer
Deputy Minister

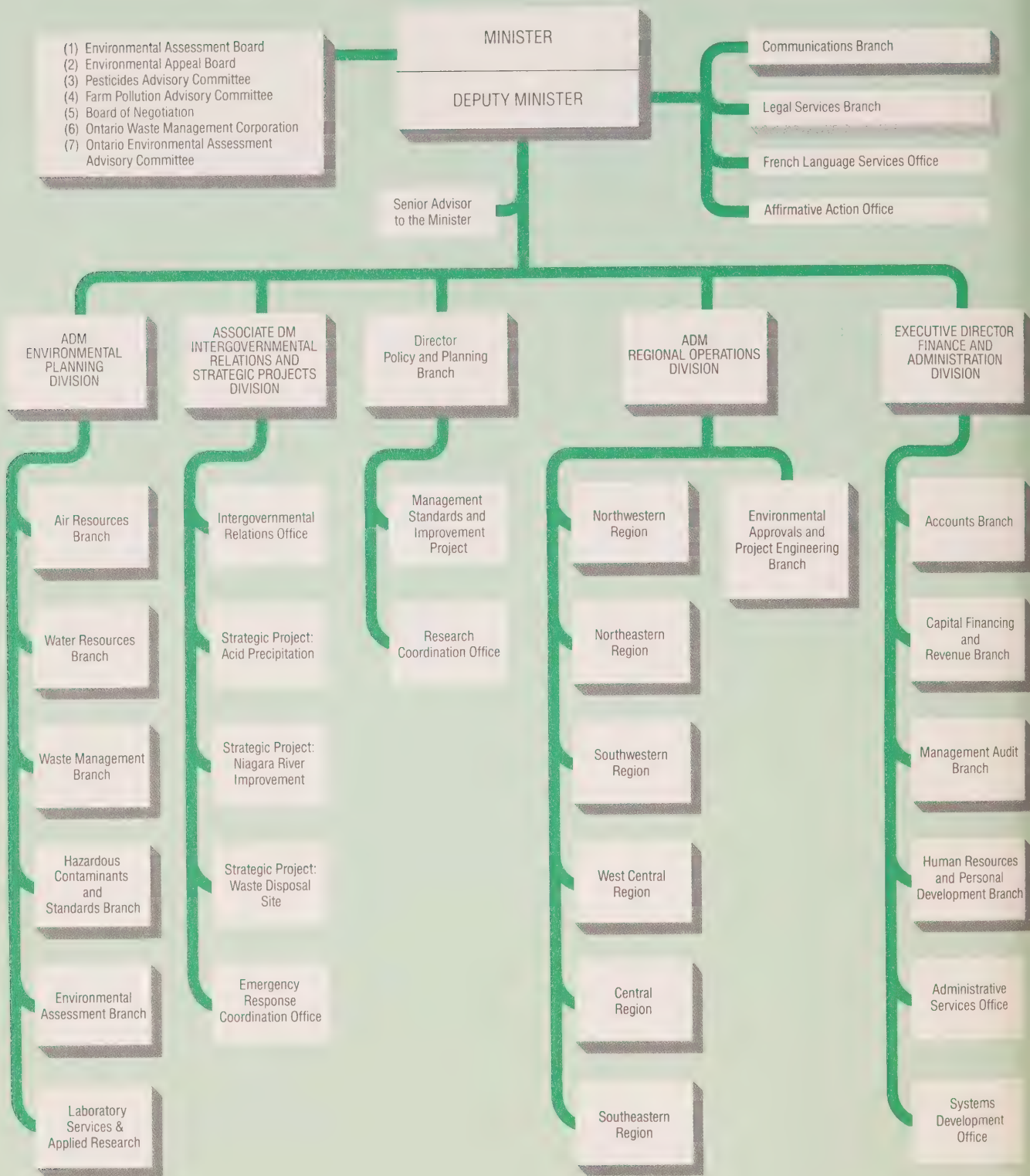
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EV
-85

Annual Report Index

	Page
Letters of Transmission	2
Minister's Message	3
Deputy Minister's Message	6
Regional Operations Division	7
Environmental Planning Division	22
Intergovernmental Relations and Strategic Projects Division	35
Finance and Administration Division	42
Deputy Minister's Office	44
Associated Agencies, Boards and Committees	49



ONTARIO MINISTRY OF THE ENVIRONMENT





To:

The Honourable
Andrew S. Brandt
Minister

Sir,

I have the honour to
submit for your approval
the annual report of
the Ministry of the
Environment for the
year 1983-84.

Respectfully submitted,

A handwritten signature in dark ink, reading "Allan Dyer".

Allan E. Dyer, M.D.
Deputy Minister



To:

His Honour,
The Lieutenant-Governor
of the Province of Ontario

May it Please Your Honour,

I have the privilege to present
the annual report of the
Ministry of the Environment
for the fiscal year beginning
April 1, 1983, and ending
March 31, 1984.

Respectfully submitted,

A handwritten signature in dark ink, reading "Andrew S. Brandt".

Andrew S. Brandt
Minister

Minister's message

I am privileged to present this report on the activities of the Ministry of the Environment during the fiscal year 1983-84.

In discussing specific projects and programs carried out by my Ministry in 1983-84, I wish to emphasize that I attach the highest priority to drinking water safety.

Ontario water supplies are of top quality. Tests have proven that drinking water in Metro Toronto is purer than bottled water available for purchase.

Nevertheless, my Ministry has undertaken extensive studies on the effectiveness of alternative water treatment processes.

In addition, my Ministry has commissioned a new \$1 million pilot study at the Niagara Falls water treatment plant. Protection of the Niagara River also continues to be a major priority of my Ministry. Our environment is threatened by numerous landfill sites on the New York side of the river, and we want to take an active part in cleanup plans for these sites, not merely make recommendations to U.S. authorities.

Ontario has already been granted the right to intervene in one U.S. court case, and we will continue to use the courts to gain direct participation in others.

A partnership agreement between my Ministry and U.S. environmental agencies is leading to improved conditions on the Great Lakes.

A good barometer of the success of this arrangement is the fisheries. Our Guide to Eating Ontario Sport Fish now shows that we can eat more fish than in the past, since testing indicates a general decline in the contaminants absorbed by the fish.

Communal sewage systems have now been provided for 94 per cent of Ontario's urban population. The Ministry also operates some 380 communal water and sewage treatment plants, and over the past five years we have spent more than \$17 million on sewage treatment facilities in the Niagara Region alone.

Major projects by my Ministry this past year have included a new water treatment plant at Port Colborne; and a \$3.5 million commitment to upgrade the Niagara Falls sewage works. In addition, my Ministry is continuing its \$3 million program supporting the repair of faulty water tanks owned by small municipalities.

Acid rain is a provincial, national and international problem, and since the Fredricton Accord of 1983 I have been working with my provincial and federal colleagues to develop an effective and affordable abatement strategy.

Since 1980, for example, Ontario has spent more than \$31 million on the acid rain problem. Our position has been strengthened by the March 6, 1984 agreement between Canada and seven of the provinces. This agreement states that eastern Canada's sulphur dioxide emissions will be reduced by 50 per cent from 1980 levels by 1994.

Unilateral Canadian action will not solve our acid rain problem, however, as studies show that at least half of the acid rain deposition in Canada is caused by emissions from across the border. Nevertheless, the position of the U.S. government is that more research is needed to establish a cause-effect relationship.

But despite the reluctance of Washington to take action, there are encouraging signs of co-operation, including a Memorandum of Understanding we have signed with New York State's Department of Environmental Conservation. I expect to sign more agreements with other states as well.

Concerning the vital area of air quality monitoring, my Ministry is developing a new air quality index with equipment costing about \$1.7 million.

In dealing with the problem of polychlorinated biphenyls, or PCBs, my Ministry is committed to the destruction of PCBs now in storage in Ontario. We have developed proposals for the regulation of mobile destruction facilities, which are being examined by a special commission.

An extensive public consultation program was also implemented following the release in June, 1983, of the "Blueprint for Waste Management". The Ministry is now prepared to go ahead with programs that will provide a comprehensive waste management system for Ontario.

This year we have distributed \$400,000 among 16 municipalities to improve or close their waste disposal sites, and altogether about 30,000 tonnes of waste are being recycled by municipalities. Since its inception in 1981, the Ministry's Source Separation Program has provided \$1.5 million to recyclers.

I rate our environmental researchers among the best on the continent. More than two million tests are conducted annually at my Ministry's world-class Central Laboratory in Toronto, and at other laboratories in Thunder Bay, London and Kingston.

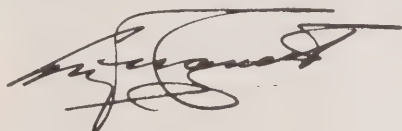
Recent advances in technology enable Ministry scientists to measure substances in water down to one part per quadrillion. To put it another way, this is the equivalent of being able to select one second out of 32,000 years.

My Ministry is also involved in consultation on issues connected to the reform of Ontario's environmental laws, meeting with citizen's groups on a variety of subjects of concern and streamlining the Environmental Assessment process.

When I assumed the environment portfolio in July of 1983, I saw my role as essentially that of a conciliator. I believe that persuading people to work together accomplishes more than mere rhetoric or shrill comment.

There are, unfortunately, times when appeals to good citizenship and the wisdom of co-operation fall on deaf ears, and in those cases my Ministry has applied our enforcement mechanism on violators. This year, due in large part to the efforts of our police-trained Special Investigation Unit, we laid twice as many charges as in the previous year.

Other problems remain to be solved and new demands will arise in the future. But I believe that the points I have touched on here, and the overview of the programs of my Ministry contained in this report, demonstrate our determination to work co-operatively with government, industry and the public to protect the health and environment of the people of Ontario.



Andrew S. Brandt
Minister.

Deputy Minister's message:

I was appointed Deputy Minister of the Environment in August of 1984, and thus was not involved in the work of the Ministry during the period covered by this annual report.

Nevertheless, I was aware, even before I joined the Ministry, that it has made great strides forward since its inception in 1972.

We have gone a long way in cleaning up conventional sources of environmental pollution. Present areas of concern are associated mainly with chemicals, the consequences of our growing industrialization in response to the demands of modern society.

I believe an important obligation of the Ministry is the interpretation to the public of the progress we have made.

The public is entitled to clear and objective explanations of technical findings, the effects of contamination and pollution, and the costs and benefits of controls.

In other words, scientific programs and findings must be interpreted in layman's language; this report attempts to do just that in describing the Ministry's activities.

It will be seen from the report that we can be justly proud that we are in the forefront of environmental abatement and protection.

As never before in history, the public is demanding that the environment be protected and preserved for future generations, and it is the primary role of this Ministry to meet the demands of that public expectation with strong and vigorous action.

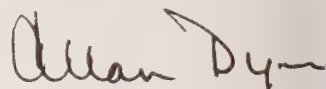
It is also our task to be vigilant in monitoring potential problems and to act quickly to bring those problems under firm control.

As a corollary to the Ministry's efforts at pollution abatement, I might add that this Province enjoys a growing reputation as a base for the manufacturing and supply of pollution abatement equipment, including instruments for water and air pollution controls.

Our policy analysts estimate that 65 per cent of Canada's pollution control equipment and service industry is now based in Ontario, with about 2,700 people employed in equipment manufacturing.

I am convinced that we can use the skills and experience of both the public and private sectors of Ontario's environment industry to develop new products, as well as scientific and engineering expertise, for the growing world market.

And I firmly believe that this activity has been stimulated in large part by the high priority that the government and this Ministry have placed on environmental protection.



Allan E. Dyer, M.D.
Deputy Minister.

Regional Operations Division

1983-84 Regional operations highlights:

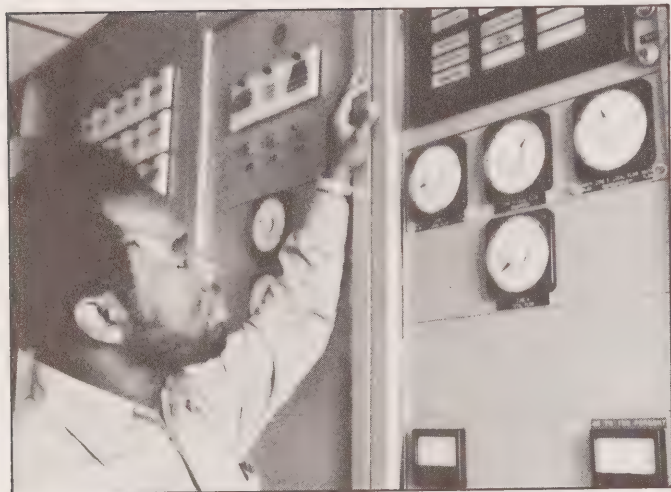
- Special Investigation Unit unearths illegal dumps.
- Citizens, companies and government co-operate to check pollution.
- Ministry makes practical preparations for a gold rush.
- Ministry money and advice aids municipal waste disposal.
- Source separation recycling operations funded.
- Cat-tail marshes used to curtail contamination.
- Sudbury science centre gets new air monitoring station.
- Laboratory develops new technique for pinpointing pungent odors.
- Advance planning assists acid lake identification.
- Ultraviolet lamps shed new light on sewage treatment.
- New \$1 million pilot plant for drinking water treatment opened.
- Government loans and grants help build municipal water and sewage treatment plants.
- York-Durham sewage system nears completion.
- Value engineering cuts construction costs.
- Ministry scientists pioneer developments in water storage tank construction and repair.
- "Red mud" research improves private sewage systems.



Operations in the field

In effect, the Regional Operations Division provides the Ministry with front line field troops for its fight against pollution.

The role of the Division includes the regulating of matters concerned with pollution sources, construction and operation of water and sewage treatment facilities, the development, operation and closure of landfill sites, the storage and use of pesticides, and the operation of Ministry water and sewage systems.



Also included in the Division's tasks is the monitoring of environmental quality, the evaluation of projects and environmental assessment regulations, the regulating of water use and noise control, and responding to public complaints and environmental emergencies.

To carry out this formidable mandate, the Province is divided into six regions: North-western, Northeastern, South-western, Central, West Central and Southeastern.

Each area has its own regional and district offices, and the Division also contains a head office and an Environmental Approvals and Project Engineering Branch.

Dispersed among the regions are members of the Ministry's Special Investigation Unit, who conduct investigations and collect evidence on illegal practices such as the unauthorized hauling or dumping of hazardous waste.

Trained in police and courtroom procedures, all SIU members are designated as Provincial Offences Officers.

Citizens report industrial pollution

One of the most important functions of the regional offices is pollution abatement, which involves taking direct action to reduce, or forestall, actual cases of air or water pollution.

As might be expected, in northern Ontario the most serious problems to be overcome from industrial sources are those from mining and smelting operations, and from the pulp and paper industry.

Southern Ontario, on the other hand, has a wide range of manufacturing industries and chemical plants. The situation is particularly sensitive in the older sections of cities, where industry is often located next door to residential areas.

A good deal of the day-to-day work in the regions consists of investigating complaints from members of the public who report specific instances of pollution.

The number and type of instances varies a good deal between the regions from year to year and the numbers themselves can often be misleading.

This year, for instance, the West Central Region investigated 2,242 complaints, of which more than half were about bad odors. Fifty-five spills of industrial chemicals were reported.

By comparison, in the Northeastern Region there were 792 complaints and 436 chemical spills, most of which were centred around the Sudbury area.

The extraordinary number of complaints about bad odors does not in fact mean that the West Central Region is now overwhelmed by noxious smells, but actually reflects an odor problem at only two specific plants, at Rothsay and Breslau.

The Sudbury figures, on the other hand, reflect a substantial increase from previous years, and appear to indicate to the Division that the public in the area is showing an increased awareness of the importance of reporting all signs of chemical spills.

Investigating fish kills

In July 1983, an accidental spill of resins and fatty acids from a pulp and paper mill on the Spanish River in northern Ontario killed more than 100,000 fish in seven days.

The results of the accident caused great concern at a nearby Indian reservation.

Investigators from the North-eastern Region conducted an investigation and laid charges against the company responsible for the spill. At year's end, the matter had not yet come to court.

Another fish kill was the subject of a prosecution this year at Rothsay, where a company in the business of rendering animal fats and wastes allowed, through over-irrigation, effluent from a treatment lagoon to run off the flooded land into creek.

Treatment lagoons were not functioning properly and the effluent had a high ammonia content.

The investigation was carried out, and charges laid, by the West Central Region's Special Investigation Unit.

Detecting industrial waste

In Bruce County, a sand trucker bought a sand pit and built a new home alongside it. When

his wife complained of a strange taste in the water from their well, he asked the Ministry to investigate.

After discovering some drums of industrial waste illegally buried in the pit, investigators from the Southwestern Region brought in an expert to make a survey of the entire property, using a sophisticated metal detector called a magnetometer.

About 230 more drums were unearthed, containing oils, industrial solvents, and metal grindings.

The investigators traced these drums back to a waste disposal operator whom a machine shop had hired to dispose of its waste seven years earlier.

At that time, the local landfill site had been declared unsuitable for this type of waste, and the waste disposal contractor had saved himself a journey farther afield by simply burying the waste in the sand pit, which he owned.

As a result of this year's investigation, the originators of the waste paid for its disposal at a suitable site and a court action was initiated against the waste

disposal operator who had buried the drums on the property.

Another investigation this year, this time by the West Central Region's Special Investigation Unit, resulted in a large chemical company being fined \$14,500 for the illegal disposal of industrial waste, and a related safety violation.

The company had been carrying out construction work on its own site when workers uncovered industrial wastes which had been buried there earlier.

The workmen then dug up the wastes and buried them elsewhere on the site, but in doing so some of the workers became nauseated by fumes, and the Ministry was informed.

As a result of the SIU investigation of the incident, the wastes were properly disposed of and the company hired consultants to ensure that no other wastes are still buried on the site.



Toronto's Junction Triangle

Most large North American cities still contain old established industrial sites that are built cheek-by-jowl alongside residential areas.

A prime example is the Junction Triangle area of Toronto's west end, which contains about 5,500 people and 20 factories.



At the time the area was developed the industrial operations were modest, and it was convenient for workers to live within walking distance of their jobs.

In those "simpler" days, most people regarded this kind of industrial activity as evidence of prosperity.

Since then, however, industrial operations have become larger and more complex, and most of the residents no longer work in the industries in their midst.

Because of complaints about smoke, odors, and other signs

This year, as part of the Ministry's intensive abatement program, an Environmental Liaison Committee was established to work out the problems of the area in a co-operative way.

The committee includes representatives of citizens' groups, the major companies in the area, and health officials from the city.

All companies ordered by the Ministry to undertake abatement programs have now complied with Ministry requirements, and have shown improvements in their operations.

The Ministry also contributed funds to a study of the health of the local residents.

Combining to clean up PCBs

At a public meeting in November, 1983, a major polychlorinated biphenyls (PCBs) cleanup program was outlined for General Electric's Davenport plant, in Toronto's Junction Triangle.

The program, now in effect, is to contain and remove oils contaminated by PCBs, which were found in several parts of the property.

The cleanup is under the general supervision of the Ministry's Central Region and the Junction Triangle Environmental Liaison Committee.

PCBs, which make efficient electrical insulators, were used in the manufacture of electrical transformers on the site for 30 years, until they were banned in 1977.

of pollution, the city established a task force and public meetings were held to study the Junction Triangle pollution problems.

The Ministry of the Environment placed the area on a special alert system that guarantees the prompt arrival of an inspector at the scene as soon as a complaint is made.

Co-operating on asbestos

Another example from the Central Region illustrates the manner in which a co-operative approach can simplify a public hearing process.

Manville Canada produced asbestos cement pipe on a site in Scarborough for 30 years, then closed the plant and proposed to sell the land for development.

The problem was that in the course of time, waste containing asbestos had been deposited on various parts of the property.

Manville's plan was to gather this waste together and dispose of it in one area, so that the land could be free for development.

Local residents were worried that during and after these consolidation arrangements asbestos fibres would be a general hazard to the public and the workers on the site.

A hearing of the Environmental Assessment Board was held in November, 1983, and prior to the hearing the Board suggested that the Ministry, the company, and local citizens get together to work out a negotiated position.

This negotiated position, already worked out between the interested parties, was then presented at the hearing, greatly simplifying the whole process.

The hearing was completed in March, 1984.

Public participation in South Riverdale

The South Riverdale area, in Toronto's east end, provides yet another example of the emphasis placed by the Ministry on involving local residents in the decision making process.

Citizen-representatives of the South Riverdale Environmental Liaison Committee meet regularly with Central Region staff, city health officials, and officers of local companies to discuss health and environmental problems.

Their participation in these meetings this year has influenced Ministry action in a number of cases.

Problem industries in the area include a tannery, which was made this year to comply with the requirements of a Ministry control order on its operations, and a soap and detergent manufacturer who is currently undertaking studies to identify the sources of odors and other emissions.

As a result of controls imposed by the Ministry, lead emissions from a smelter in the vicinity are now in compliance with approved standards.

A problem remains, however, with the lead that has accumulated in the soil over the years, especially in residential areas, and the views of Liaison Committee members are a valuable asset in the Ministry's efforts to find a solution.

Practical preparations for a gold rush

Gold was discovered in the Hemlo area, 300 kilometers east of Thunder Bay, over a century ago, but the gold field is only now being developed.

Of the three companies involved, only Noranda Mines has made a formal application to the Ministry, calling for a 1,000 tonnes a day operation by January, 1985, which will expand to about 3,000 tonnes per day by 1987.

Among the three companies there are 77 million tonnes of ore in reserve, and it's estimated that more than 750 people will be employed.

Since the gold does not come in grains or nuggets, but is dispersed as tiny spots throughout the ore, it takes four tons of this ore to produce one ounce of gold.

Environmental concerns that must be taken into account by the Ministry include the intake of water used in processing the ore, the treatment of waste water, and the discharge of effluents into streams.

In addition, the nearby communities of Marathon and Manitouwadge will be expanded to absorb an influx of new workers and their families, and will need larger water and sewage plants and waste disposal sites.

Several public meetings were held by Northwestern Region staff during 1983-84 to explain Noranda's proposals and to assess the public's response.

Some people were worried about the effect on fishing and hunting in the area, cottagers were concerned about the water in their local creek, an Indian band was anxious about environmental damage, and Pukaskwa National Park is located downstream on the Black River.

After five public information sessions and two public meetings, the Ministry finally approved a tailings impoundment area and waste water treatment system for Noranda Mines in February, 1984.

"Tailings" refers to the liquid which remains after the gold

has been extracted from the pulverized ore. After settling in the tailing ponds, the liquid will be treated to remove cyanide and heavy metals before being discharged.

About 15 per cent of Noranda's total production costs at Hemlo are expected to go towards environmental programs, and the company is also committed to a program of reclamation and stabilization of the mine site after it has been closed.

Refineries reduce sulphur dioxide

The reduction of sulphur dioxide emissions, which are a major component of acid rain, is a priority task throughout all of the Ministry's regions.

In the Northeastern Region, for example, new sulphur dioxide

control programs were placed this year on the International Nickel Company's Copper Cliff nickel smelter and refinery complex, and at a nearby Falconbridge operation, where the company will develop and operate a new emissions control system.

In the West Central Region, \$10.6 million was spent this year by Stelco and Dofasco steel plants in Hamilton to comply with Ministry requirements for reduction of air and water contaminants.

A major reduction in sulphur dioxide in the last 10 years means that the main emphasis with regard to air pollution is now on the control of minute particles (particulates) in the air.

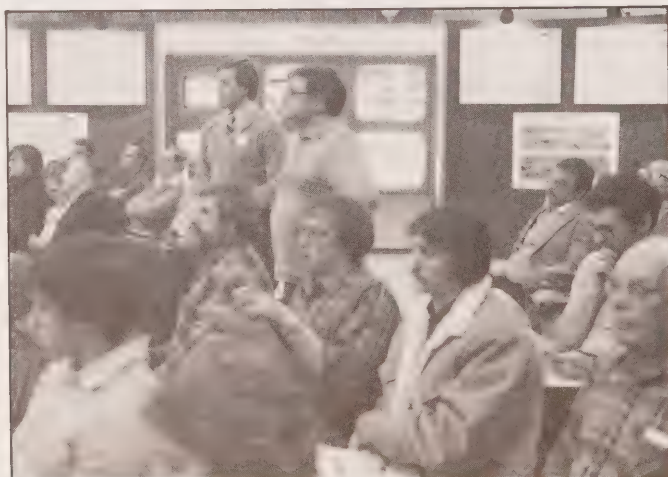
Keeping an eye on water and waste

Inspecting and monitoring water treatment plants, sewage treatment facilities and waste disposal sites is an important part of the activities of regional offices.

Examples from the West Central and Central regions provide a good overview of the extent of individual on-site inspections carried out by regional staffs during the year.

In the West Central Region, 429 visits were made to municipal sewage and water treatment plants, 330 visits to waste disposal sites and 290 inspections were made of sewage sludge disposal sites.

Central Region's visits were as follows: 1,809 to sewage and water treatment plants, 1,052 to waste disposal sites, and 569 to sewage sludge sites.



Money and advice aids municipalities

During 1983-84, the Ministry provided both money and advice to municipalities for the improvement of their waste disposal sites.

In the Central Region, 15 municipalities received \$96,000 for improvements to such sites, ranging from the provision of fencing to equipment designed to prevent the escape of methane gas and leachate.

Ministry money and expertise was also used during the year to encourage municipalities to develop waste management master plans.

The idea is that a municipality, or group of municipalities, can consider a wide range of options for disposing of their wastes, and also take into consideration the Province-wide picture before deciding on the best way of solving their own problems.

Regional staff members often sit, in an advisory capacity, on local committees set up for this purpose.

Master plans were begun this year for the County of Essex, Grimsby, Hearst-Kapuskasing-Cochrane and Black River-Matheson; and the regional municipalities of Niagara, Haldimand-Norfolk, and Sudbury.

Submissions received this year by the County of Essex, in the Southwestern Region, indicate the kind of alternatives reviewed by local committees and regional staffs throughout the Province.

Proposals from companies dealt with mass burning incinerators, refuse-derived fuel

incinerators (which burn garbage), composting, and long distance hauling and disposal of refuse.

Since public participation is always an important part of the decision-making process, regional staff are involved in numerous public meetings held to fully explain the alternatives.

Because it may be some years before a suitable landfill site is available, regional and County of Oxford staffs have developed a contingency plan.

The basis of the plan is to fill consecutively all the remaining landfill sites within the county, and then, if necessary, truck the wastes to a site outside of the county.

Laboratory waste disposal

The disposal of pathological wastes from medical laboratories has increased a great deal in recent years, creating new challenges for Ministry waste disposal experts.

Today, 80 per cent of pathological (disease infected) wastes handled by licensed haulers comes from laboratories, and is largely made up of plastic containers and other disposable laboratory supplies.

Specially designed incinerators are required for the disposal of this type of waste, and an incident that took place this year in the Central Region provides a good illustration of the health hazards created when things go wrong.

A hospital incinerator which was being used by a major pathological waste disposal contractor developed operating

problems and was withdrawn from service.

In the spring of 1984, approximately 50 tonnes of the contractor's pathological wastes were found stored illegally in a trailer and warehouse in Markham.

Unable to destroy the wastes, the contractor had simply stockpiled them during the winter.

Ministry staff moved swiftly to transfer the contaminated wastes to refrigerated storage and arrange for their emergency disposal.

The wastes were then incinerated, under staff supervision, at the Federal Government's Animal Disease Research Institute in Ottawa and the Ministry's Experimental Resource Recovery facility at Downsview.



Recycling funded

Ten recycling operations in 15 Ontario municipalities received grants totalling \$890,000 this year, under the Ministry's source separation program.

The municipalities have a combined population of one million people.

As the name implies, source separation consists of separating wastes that can be recycled from other wastes before they are disposed.



A good example of how the grants are used comes from Kitchener, in the West Central Region, where the Ministry gave a grant of \$110,000 to Laidlaw Waste Systems.

The company used the grant to expand a pilot project into a city-wide source separation system serving a population of 140,000.

The company provides colored plastic containers to homes, for the disposal of glass, paper, and metals, and collects these

recyclable materials weekly in specially-designed one-man trucks.

Cat-tails curtain contamination

Scientists from the Ministry's Northeastern Region literally went "back to the land" this year, when they put into operation a new experimental system that uses cat-tail reed marshes instead of expensive sewage treatment plants to purify water.

The project, located in Cobalt, involves pumping raw sewage into a specially prepared artificial cat-tail marsh, which provides a stable environment for micro-organisms that are essential to sewage treatment.

The nitrogen and phosphorus in the sewage are absorbed by the marsh plants as they grow, and in contrast to the more random flow of water in natural marshes, the artificial marshes can be carefully laid out to prevent "short-circuit-

ing" of the flow and ensure that all areas of the marsh are used.

The Ministry has had good results from similar experimental marshes in southern Ontario and wants to know what the effect of the colder climate of northern Ontario will be.

If this year's experiment is successful, it will provide an inexpensive solution to Cobalt's sewage treatment problems.

Ministry administers private sewage

In certain parts of Ontario, the Ministry of the Environment, rather than the local health unit, administers Part VII of the Environmental Protection Act, which deals with the approval and use of private sewage systems.

There are 700,000 of these private sewage systems, serving two million people, in the Province.



This year, for example, there were 1,690 applications for Certificates of Approval submitted to the Southeastern Region, and staff investigated approximately 675 complaints.

In the Central Region's Muskoka-Haliburton recreation area, 879 private sewage systems were inspected, and 253 were found to be malfunctioning or causing pollution.

In the District of Muskoka alone, staff made 2,537 inspections in connection with the installation of new septic and holding tanks.

Students taught environmental awareness

Since 1967, Central Region staff members have talked to about 7,000 Grade Five and Six students from public schools in the District of Muskoka and the County of Haliburton.

The idea of the visits is to instill environmental awareness in the children, and it has been found that it is these grades that are the most receptive.

During the lessons the youngsters are shown equipment such as pH meters, depth samplers, jar testing apparatus, soil probes and augers, and acid rain monitoring instruments.

The students also prepare projects, posters, essays, poems and models, which are evaluated by the visitors from the Ministry.

The 12 children who prepare the best projects receive certificates of merit signed by the Minister and get to spend an "environmental work day" with staff workers in the field.

Activities may include a tour of a sewage treatment plant in the morning and an afternoon trip out on a lake, helping a biologist to carry out experiments.

The lake trip, incidentally, was originally designed as a simple cruise, but the fledgling environmentalists asked to take part in more concrete activities.

The program alternates between Muskoka and Haliburton, and this year it was Haliburton's turn, with 284 students involved in the projects and activities.

During 1983-84, the Southwestern Region operated 71 monitoring instruments, 85 suspended particulate samplers, and 23 monthly sampling monitors.

The West Central Region operated more than 200 monitors, and the Northwestern Region operated a total of 113 monitors and precipitation samplers. Central Region, in its turn, maintained a network of 460 monitoring instruments in 26 communities.



Assessing the air

Regional offices continually operate air quality monitoring instruments and instruments to measure suspended particulates in the air.

The airborne particles measured by the instruments include both pollutants and natural substances such as pollen.

Statistics from four regions give a good picture of the amount and type of air quality monitoring that is continuously going on in all areas of the Province.

Air monitoring goes public

Visitors to Science North, Sudbury's celebrated science centre, will have the opportunity of taking a behind-the-scenes look at a genuine air quality monitoring station, as a result of Ministry initiatives this year.

The science centre, located in the Ministry's Northeastern Region, received a \$100,000 grant to set up an exhibit built around the air quality monitoring operation.

The Ministry also furnished the equipment to be installed in the working station, which will provide information on sulphur dioxide, ozone, oxides of nitrogen, soiling index, and total reduced sulphur.

Another new air quality monitoring station, opened this year at the Acidic Precipitation in Ontario (APIOS) site at High Falls, to the west of Sudbury, played host to the public during the year.

Among the visitors were a group of European scientists, who toured the site as part of their introduction to the work of the Ministry.

The answer was blowing in the wind

The odors blew in from the east, and in from the west, but the City of Cornwall just didn't know where to find them.

Emissions from a paper mill to the west of the city include mercaptans (which smell like skunk) and hydrogen sulphide (H_2S —which smells like rotten eggs), and a cellulose plant to the east of the city produces similar rancid smells.

To add to the dilemma, the burning process used to reduce these emissions results, because of added oxygen, in the release of sulphur dioxide (SO_2) into the air.

Monitoring the mercaptans, H_2S and SO_2 proved to be a real problem because it was almost impossible to decide which of the two plants was producing a particular batch of bad smells at any given moment.

This year, however, an ingenious answer to the problem was discovered by the laboratory of the Ministry's South-eastern Region.

The laboratory used three strategically-placed air monitoring stations, a small meteorological station (which measures wind speed and direction) and a specially-written computer program to solve the mystery.

By collating information collected from the stations, monitoring personnel can now trace the odors to the specific plant that is producing them.

The new method will also be useful in other situations where data from continuously operating monitoring equipment can be analysed.

The Ministry, in fact, is considering applying the technique to southern Ontario, where air emissions might be more definitely assigned to areas such as Detroit, Windsor, Sarnia, or Metro Toronto.

Advance planning aids acid lake identification

In 1983-84, 50 lakes and streams in the Ministry's North-western Region were evaluated for sensitivity to acid rain.

Five hundred other lakes in the region have been tested for acid rain damage since 1979.

Three acidified lakes were identified in Pukaskwa National Park, but at the moment it remains uncertain if the damage was from acid rain, or from natural causes.

Natural damage could occur, for example, from organic acids caused by the breakdown of organic matter such as decomposing leaves in the forests.



In any case, the sulphate levels of lakes have been found to increase as one moves east from the lakes near the Manitoba border where sampling took place.

Interest in the Northwestern Region has increased since the creation of Ontario Hydro's coal-fired generating station at Marmion Lake, near Atikokan.

Area residents, and others, were concerned about the station's possible effect on nearby Quetico Provincial Park and the Boundary Waters Canoe Area in Minnesota.

Now that the generating station is being built to produce only 200 megawatts of electricity, rather than the 800 Mw originally announced, concern has diminished.

Nevertheless, the Ministry is planning to monitor the station for at least three years after it goes into operation, which will probably be in the fall of 1985.

Advance planning is necessary because the main operation of this generating station will be during the winter, when SO₂ from the plant is deposited and builds up on the ice.

Getting water samples can be difficult at the best of times in these remote areas, but particularly so at the critical moment of spring break-up, when the highest concentrations of SO₂ will enter the water and could cause severe short-term acidification.

During this period it is virtually impossible to land by plane on the ice to collect samples, and the Ministry is now developing other ways of reaching sites that are located far from roads.

Regional consultation increases

Regional offices play an important role in providing an on-the-scene viewpoint on proposals submitted to the Ministry's head office or other agencies for approval.

The Ministry's Central Region serves as an illustration of the sort of submissions that may be received by a region for comment during a year.

Since the introduction of a new Planning Act for Ontario, the number of proposals circulated to the region for preliminary comment has been on the increase.

In 1983-84, the region reviewed 261 plans of subdivisions or proposals for condominiums, 237 Official Plans and Official Plan Amendments, and 31 submissions related to the Niagara Escarpment planning area and the Parkway Belt.

Sixty-three proposals under the Environmental Assessment Act were also reviewed by the region during the year.

Shedding new light on sewage purification

Normally, effluents from sewage plants are chlorinated to treat them. The Ministry, however, is also developing other treatment methods.

This year, scientists at the Ministry-owned Tillsonburg treatment plant have come up with an experiment that's bound to shed new light on the situation.

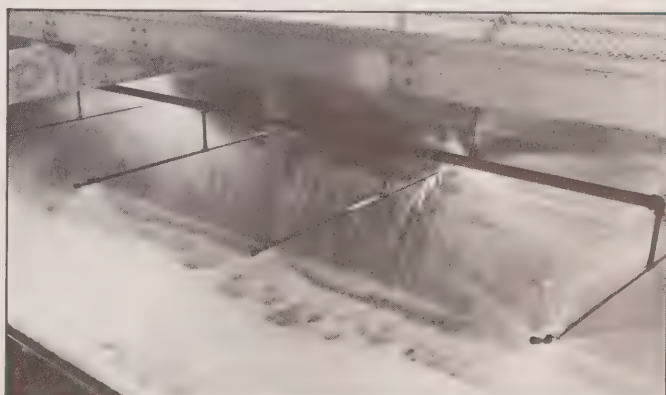
Researchers are using ultraviolet light (which kills microbes in the effluent) to treat sewage at the plant.

The ultraviolet treatment is already known to be quite effective when used on effluent that is clear, but it remains uncertain just how much the effectiveness of the treatment is reduced when the effluent is murky or contains floating solids.

The Tillsonburg plant, located in the Southwestern Region, is particularly suited to the continuing experiments, since it actually consists of two separate facilities run side by side.

Thus one of the buildings can be operated in the normal way, using chlorine as the purifying agent, while the other is used to test the ultraviolet light treatment.

A computerized experiment was also begun at Tillsonburg this year to find the most



efficient and energy-saving way of running the entire operation.

Regional staff operate a number of sewage treatment and water supply plants in the Province, with Ministry-operated facilities serving a population of about 750,000 in the Southwestern Region and 550,000 in Central Region, to cite only two examples.

Sanitary sailors

Under Ontario's Boating and Marina Regulations it is illegal to discharge sewage from boats into the water; it must be pumped out at an official pump-out station.



In the West Central Region, 190 pleasure boats and 40 marinas were inspected this year to see if their sanitary arrangements conformed to Ministry requirements.

Only two boats were found to be in violation of the regulations.

Using carbon to kill contaminants

A \$1 million pilot study using granulated activated carbon (GAC) to purify water was begun this year at the West Central Region's Niagara Falls water treatment plant.

The study is to determine the efficiency of GAC in treating the drinking water.

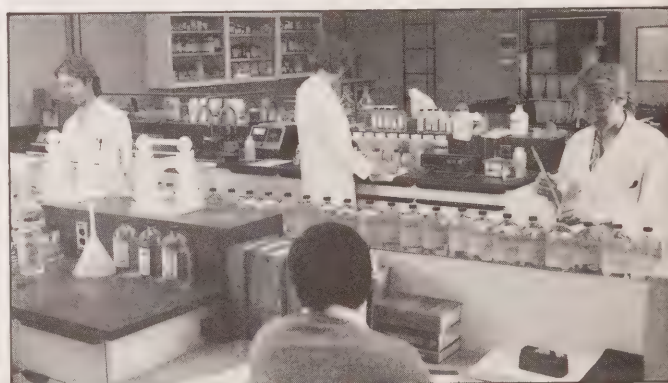
The pilot plant essentially consists of several columns filled with GAC which allow the effects of various coagu-

lants to be investigated, as well as the pH of the treated water.

(The pH scale, ranging from 0 to 14, is a measure of acidity and alkalinity with 7 neutral, and 0 and 14 the respective acid and alkaline extremes.)

The study will also help scientists determine the best thickness of the GAC bed needed to remove certain contaminants, the effects of water pressure on the bed, and a number of other relevant details.

The GAC-treated water will not, however, be mixed into the Niagara Falls drinking water distribution system.



The GAC study will take about three years to complete, and is the final stage of a three-stage research program dealing with drinking water treatment technology.

Analysis keeps labs busy

Regional laboratories in Thunder Bay, London and Kingston were kept busy during the year with chemical and microbiological analyses.

In the Northwestern Region there were about 140,000 analyses, an increase of more than 10 per cent due mainly to a special study of Lake Superior by the Ministry's Water Resources Branch.

The Kingston laboratory performed about 120,000 tests, a reduction of about six per cent, and the London laboratory carried out more than 220,000 tests during the year.

Environmental approval requests rise

The Environmental Approvals and Project Engineering Branch is responsible for reviewing and processing applications under the Environmental Protection and Ontario Water Resources Acts.

The branch also provides engineering and construction assistance to municipalities in developing water supply and sewage treatment plants, and promotes consideration of the environment in land use policies and programs.

The number of applications for approval under the Environmental Protection Act rose by 10 per cent during 1983-84, with 943 water and 1,213 sewage plant submissions handled by the branch.

Industrial plant applications totalled 755, a 20 per cent rise from last year, and there were 268 applications in connection with waste management sites and systems.

Sewage and water works construction

In order to aid in the construction of sewage and water works, the Ministry has developed a program that gives grants and subsidies to municipalities and administers construction contracts.

This year's highlights were:

—The Ministry administered 82 construction contracts, at a total capital cost of \$68.3 million. Of this, \$18.6 million, or more than 27 per cent, was provided in subsidies to municipalities.

—Direct grants of \$46.5 million were made to municipalities for constructing municipally-owned water and sewage facilities.

—The Ministry gave \$3.6 million in grants for the repair and renewal of private sewage and water systems in small communities. Such sewage systems are generally of the septic tank and tile bed variety.

This program is a practical step to save money and time, by avoiding expensive large-scale water and sewage plants where they are not necessary.

—To help build municipally-owned water and sewage plants, \$4.3 million was given in direct grants under the job creation program administered jointly by the Ministry and the Board of Industrial Leadership and Development (BILD).

—Grants of \$10.3 million were given to help the construction of sewage facilities in the Great Lakes Basin. This was under the Canada-Ontario Agreement Sewerage Program (COASP), a joint federal-provincial effort.

Locations of some of the above mentioned projects are: Keswick, Wasaga Beach, Belleville, Innisfil, Thunder Bay, Ignace, Parry Sound, Sudbury, North Bay, Timmins, Nakina, Longlac, Geraldton, White River and Hornepayne.

The works at Wasaga Beach are to aid the Ministry of Natural Resources' plans to develop the town as a high-profile recreational area.

York-Durham system nears completion

An expenditure this year of \$18.8 million signalled the near-completion of the York-Durham sewage system.

The system is now completed except for the Aurora and Newmarket pumping stations, which were still under construction at year's end.



This system is more than 100 kilometers long and will eventually carry the wastes of 800,000 people.

The system runs southwards from Newmarket near Yonge Street, then eastwards through Markham, down to the Dufferin Creek sewage treatment plant at Pickering, on Lake Ontario.

Another branch runs from Woodbridge eastwards to link up with the main trunk line.



The York-Durham system replaces small sewage treatment plants on the Don, Humber, Rouge and Holland rivers, which will now be protected from pollution, and the phosphorus loadings to south Lake Simcoe will be reduced.

Development of the system has sparked a vigorous industrial, commercial, and residential growth in the serviced area north and east of Toronto.

Total costs for the system, including its Dufferin Creek plant, are now about \$260 million, with the Dufferin Creek plant designed so that it can be progressively extended as the population demand increases.

The plant is computerized to provide instant data, so that its operations can be controlled from a central control panel.

In parallel with the sewage collection system, a 4-million gallon water supply system to serve the York Region is also largely completed.

The Ministry spent more than \$600,000 this year on the York water system, and began design work on the main outstanding items, the Langstaff and Clark Avenue water mains.

Value engineering cuts costs

In its quest for value-for-money, the branch's Value Engineering Unit carries out cost analyses and suggests alternatives for water and sewage systems.

Among the 100 projects evaluated in 1983-84, the Aylmer sewage treatment plant, a municipal project, deserves special attention.

The unit's evaluation of the project resulted in advice on redesign that led to a saving of approximately \$1.35 million, or about one-third of the original estimated cost of slightly more than \$4 million.

Water storage tanks studied

Under contract to the Ministry, consulting engineers from Queen's University have been doing research this year on ways to improve the construction and repair of high-level municipal water storage tanks.

Special emphasis was placed on the study of tanks made of reinforced concrete.



Experts diagnose equipment ills

Technical experts of the Special Engineering, Design and Equipment Unit regularly visit sewage and water treatment plants to help solve problems that crop up with equipment such as pumps, diesel engines, and water meters.

The engineers, who also give advice on the design of new treatment plants, made 625 of these visits during 1983-84.

In addition, they worked with the Ministry of Transportation and Communications and the Municipal Engineers Association to prepare a new set of standards for the construction of municipal services in Ontario.

The research included studies on the way in which deterioration takes place, the protection from freezing of concrete tanks exposed to freeze-and-thaw conditions, the effects of ice expansion in the tanks, and a survey of protective coatings for both concrete and steel water tanks.

The research has led to some pioneering developments in the field of water storage tank repair.

An example, completed this year, featured steel reinforcing cables, set in grease inside protective plastic sleeves and wrapped around the outside of the cylindrical tank and tensioned.

Two-inch slabs of polystyrene insulation were installed on the outside to prevent the water in the tank from freezing, and steel siding was then added to keep the weather out.

Freezing water is a general problem with these tanks, and it was discovered that in some cases the expanding ice forms a "bridge" right across the inside of the tank, putting pressure on its walls.

Besides adding insulation, other ideas were considered to lessen the amount of freezing in the tanks.

Options studied included the warming of water by solar power, and using wind power to produce electricity to warm or stir the water.

Thus far, however, the polystyrene insulation has proven to be the best solution to the problem.



Tracking down noise

In 1983-84, the Noise Assessment Unit investigated complaints about operations that included a greenhouse (fans), race tracks, a railway yard, and snowmaking machines.

The unit also commented on proposals that included gravel pits and quarries, industrial plants, a Formula One auto racing track and a grand-prix motorcycle track.

The motorcycle racetrack proposal had an interesting twist, because the man who wanted to open the track submitted a report from a noise consultant, which was forwarded to the Ministry for comment.

Ministry staff were suspicious of the report and discovered that the track operator had "doctored" the end of it to make it conform completely with his own conclusions.

After detailed Ministry analysis the proposal was eventually approved, but with stringent conditions imposed.

"Red Mud" research aids sewage systems

As a result of the completion this year of seven years of Ministry research, filter-type beds may be installed in private sewage systems that are too small for standard beds.

Private sewage systems usually consist of septic tanks and "tile" (leaching) beds, which are subsurface drainage systems that discharge below the ground, unlike municipal sewer systems which discharge into surface waters such as rivers or lakes.

In standard beds, the perforated distribution pipes are laid in gravel in individual trenches,

but in the filter-type of bed the pipes are laid in a continuous bed of gravel, with a thick layer of selected sand underneath it.

The Ministry researchers found that by adding a layer containing "red mud" to the filter bed, they could achieve a great reduction of phosphorus.

"Red mud" is an inexpensive waste by-product of bauxite



purification which contains oxides of calcium, aluminum, and iron.

This method of reducing phosphorus is not normally necessary in Ontario, where the process by which the sewage passes through the leaching beds and is absorbed into the ground usually takes care of the problem.

Nevertheless, in jurisdictions that allow surface discharges, such as into ditches or water courses, the process will be very useful.

The system itself is unique, and has been patented by a company in the United States.

Negotiations with a U.S. company that will design and install the system under licence were nearing completion at year's end.

Environmental Planning Division

1983-84 Environmental planning highlights

- New mobile monitoring van drives researchers direct to sources of air pollution.
- Ministry and OPP combine forces to put the brakes on vehicle emissions.
- Report predicts farm crops increased by \$23 million if ozone levels kept down.
- Water monitoring shows cleanup measures to be effective.
- Loquacious clams used to pinpoint pollution.
- \$1 million spent on termite control.
- Ministry's laboratory output increased.
- Acid rain testing on the rise.
- Waste management policies and practices reviewed.
- PCB disposal facilities studied.
- More than \$1 million spent on waste disposal.
- Recycling turns trash into cash.
- Comprehensive inventory of dangerous disposal sites completed.
- New Technology Assessment Section aids investigators.



Planning for the future

To paraphrase poet Robert Burns, "the best laid plans for mice and men," might serve as a lighthearted unofficial motto for the Ministry's Environmental Planning Division.

Unlike the aborted plans referred to by the great Scots bard, however, the Division's

Various units of the branches lend their planning, technical and scientific expertise to all of the Ministry's major programs and activities.

Special units and programs

In 1983-84, a special mobile survey and emergency response unit of the Air Resources Branch carried

Evaluations were carried out of measurement methods of a variety of pollutants and recommendations made on funding of air pollution studies and research at Ontario universities.

Another special unit contributed to the development of a list of hazardous contaminants published in an environmental handbook.

Measuring air quality

Guidelines and standards for pollutants in the air we breathe have become almost as necessary as the air itself.

In order to ensure that emission levels are being adhered to, the Air Resources Branch operates a network of 1,250 instruments in 125 locations across Ontario.

In 1983-84, this network produced about 3 million measurements which were processed by computer. The level of 12 contaminants or classes of contaminants, as well as meteorological factors, were measured.

The Ontario Air Pollution Index was monitored and publicized daily, and a new Ontario Air Quality Index developed for implementation in 20 cities.



"best laid plans," which have an effect on mice, men, and everything else to do with the environment, are put into practice across the Province.

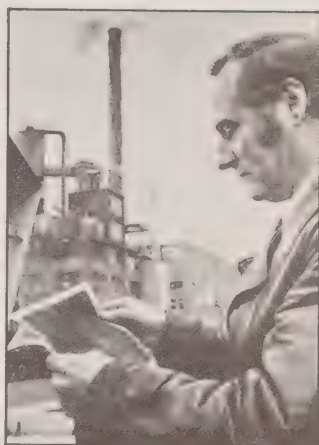
The Division's six branches are responsible for developing plans, programs and policies, and providing technical and scientific support to regional operations.

The respective branches are Air Resources, Water Resources, Waste Management, Hazardous Contaminants and Standards, Environmental Assessment, and Laboratory Services and Applied Research.

out 15 air quality surveys in industrial areas across the Province.

The unit also responded to two emergencies involving chemical spills, and developed and evaluated instruments to measure concentrations of non-routine air pollutants and organic vapors.

The branch also contains special units which worked on precipitation and air chemistry studies, participated in a joint Canada-United States study of long range transportation of airborne pollutants, and began work on an oxidants study in the Sarnia area during the year.



Smoking out pollution

The day may appear to be clean and clear, but smoke from sources ranging from giant industrial smokestacks to the tiny stovepipes of wood-burning stoves will still be pouring pollution into the atmosphere.

In order to control this kind of airborne pollution, Ministry air resources and waste management personnel have increasingly pooled their research on the incineration of hazardous materials in 1983-84.

One of this year's major projects was the co-ordination of a test program at the Hamilton-Wentworth Region's Solid Waste Reduction Unit.

Following a series of combustion tests designed to establish satisfactory burning conditions, 13 further tests were carried out under a variety of operating conditions and analyses made for dioxins, furans, and other pollutants.

Test results were used to determine acceptable condi-

tions for incinerator operation at the facility.

The branch assisted regional offices with expertise regarding emission control technology and co-operated with industry in a study of asphalt plants.

Of particular importance this year were studies of the problems of particulate matter from industries in the Beachville area and the control of sulphur dioxide from Algoma Steel at Wawa.

The branch collaborated with the California Air Resources and Waste Management boards in carrying out tests of dioxin and furan emissions and proposed control methods for an incinerator in Japan.

Studies of the combustion of wood, wood by-products, and the use of wood stoves were also initiated with the Canadian Standards Association this year.

Going straight to the sources

During the fiscal year, the Air Resources Branch commissioned a new monitoring vehicle that can now drive

researchers directly to the source, to instantly measure levels of pollutants discharged into the atmosphere.

Called the Stationary Source Emission Monitoring Unit (SSEMU), the mobile monitoring van became fully operational in July, 1983, and was used to conduct emission measurements at Riverdale Hospital, Toronto, and at Stelco, Nanticoke.

Source measurement programs were also initiated to evaluate the monitoring of total reduced sulphur emissions from kraft paper mills.

Putting the brakes on vehicle emissions

With the number of vehicles on Ontario's roads growing each year, monitoring automobile-created air pollutants such as nitrogen oxide, carbon monoxide and hydrocarbon emissions is of prime importance to the Air Resources Branch.

This year branch investigators checked 3,758 cars for emission controls and exhaust emission



levels, and 1,778 (or 47 per cent) of cars tested failed to meet Ontario standards.

Drivers were requested to have the problems corrected. Twelve per cent (or 445 cars) had faulty pollution control equipment and operators received violation notices.

A total of 2,855 cars were inspected at used car dealerships, with 77 violation notices issued, and visits made to 73 muffler shops to ensure proper replacement of catalytic mufflers.



In addition, two inspectors from the branch accompanied Ontario Provincial Police highway patrols which resulted in 385 diesel trucks being stopped for excessive smoke emissions.

Three-hundred and fifty-six charges and 29 warnings were issued, and 311 operators convicted and fined as a result of these patrols.

Analysing Ontario's crops

In 1983-84, air resources staff conducted examinations of soil and vegetation in the vicinity of 106 industrial and other sources of emissions.

The branch investigated 173 complaints about possible damage to vegetation as a result of air pollution including acid rain, and one-third of these problems were found to be caused by contamination.

Several of the complaints involved possible economic loss to farmers, and reports were made to a negotiation board in the event of damage claims being made.

Staff conducted extensive surveys to determine the degree of ozone injury to white bean, potato and tomato crops throughout southwestern Ontario.

The surveys determined that oxidant injury to crops was less severe than in 1982.

During the year a report was issued based on several years of observation of atmospheric levels of ozone and related crop damage.

The report estimated that farmers could increase crop production amounting to as much as \$23 million a year if ozone levels are kept within Ontario standards.

Extensive studies on forest crops and soils were also carried out as part of the Province's Acidic Precipitation in Ontario Study (APIOS).

Watching the waters

Like the air we breathe, the waters we drink, bathe and fish in are in constant need of protection.

Just as constantly, the Ministry's Water Resources Branch monitors those waters to establish guidelines that ensure the water is safe for drinking, aquatic life, and recreational use.

Monitoring of the Great Lakes has shown that remedial measures are having a positive effect.

Three examples are:

Monitoring at Thunder Bay during 1983-84 showed that efforts to clean up pulp and paper mills in the area have resulted in a decrease in BOD



(biochemical oxygen demand) loadings, and bacterial contamination has also decreased because of improvements on municipal waste discharges.

Reduced levels of phenols in the St. Clair River this year are attributed to an extended out-fall at the Township Ditch and improved operations at Polysar and Dow Chemical plants.

An investigation of trace contaminant distribution and aquatic life in Lake St. Clair also revealed that mercury levels have declined in sediment and the diversity of aquatic life on the lake bottom has improved this year.

Ministry water researchers, however, have ways of making the real close-mouthed little mollusks "talk" until they sing like canaries about sources of aquatic pollution.

Simply put, the clams are collected by divers and placed in wire cages not unlike a small supermarket shopping basket, and lowered into the water to be tested at a depth of about six feet.

Since clams live in sediment, they collect and accumulate measurable quantities of chemicals and pollutants along with their natural nourishment.

Biological monitoring using freshwater clams was carried out this year in the St. Clair and Detroit rivers.

International waters

The Niagara River has been identified as a potential source of contamination in Lake Ontario, and most of this contamination comes from the United States' side.

Three major studies were undertaken in the river this year to identify sources of contamination, determine changes in lake bottom aquatic life since 1967, and identify locally affected areas.



Loquacious clams pinpoint pollution

As any experienced investigator can tell you, "silent as a clam," and to "clam up," are phrases used to describe a witness who won't give out any information.

After several weeks the clams are again collected and subjected to a variety of laboratory tests which reveal the levels of substances they have absorbed from untreated water.

Further and more detailed testing may even be used to pinpoint sources of pollution.

Staff also provided assistance to the international Niagara River Toxics Committee in its report on U.S. and Canadian sources of pollution, and made recommendations for their control.

This year, total phosphorus loading estimates from 63 major Canadian tributaries to the Great Lakes were summarized for the period going back to fiscal 1982-83.

The summaries were issued to the International Joint Commission (IJC) for inclusion in the Water Quality Board Report.

Watershed studies completed

Water resources personnel completed a number of river basin studies during the fiscal year.

The studies were aimed at assembling data on water quality, aquatic plants and algae, hydrology, and pollutant loadings from sewage plants, industrial discharges and agricultural areas.

The three-year Stratford-Avon project was completed and demonstration remedial-measures projects initiated to protect streams from urban and rural sources of pollution.

The four-year Rideau River Stormwater Management Study, conducted in co-operation with Environment Canada, the municipality of Ottawa-Carleton, and the cities of Ottawa and Nepean, was also completed.

Its purpose was to evaluate stormwater runoff loadings into the river from urban areas.

Reports were also completed on water resources inventories of the Credit River, portions of the Humber and Don rivers, and on the basins of Etobicoke and Mimico creeks.

Groundwater management

Licences were issued to 453 well-drilling and boring contractors by water resources staff during the year.

Groundwater surveys and reports were completed for two municipalities, two well-performance inspections carried out, and four test-drilling projects were supervised during the same period.

Geophysical investigations to help solve contamination problems at 20 locations were instituted, and staff assisted in solving well-interference problems at eight capital works projects.

Ten groundwater susceptibility maps and one groundwater probability map were published, and the impact of acid rain on groundwater was studied as part of the Ministry's Acidic Precipitation in Ontario Study (APIOS).

Setting standards

An important part of the Ministry's management of toxic substances is the development of standards for hazardous contaminants that affect air, water, soil, sediment and biological organisms.

In order to do this, information on the contaminants is synthesized into scientific documents which serve as the basis for assessing risk and control factors.

This year, for example, a major review of micro-organisms in recreational waters was completed and work begun on a comprehensive study of dioxins and dibenzofurans.

At the Ministry's request, the first comprehensive survey of the use and discharge of chemicals in Ontario was completed by the Canadian Chemical Producers' Association.

This document is now being used by Ministry staff to prepare exposure estimates of chemicals in the environment.

The Hazardous Contaminants and Standards Branch of the Ministry also shares its own expertise with industry, government, the public, and various international pollution control agencies.



Controlling pesky pesticides

Another key element of the management of hazardous contaminants is the control of pesticides, including their distribution, sale, storage and use.

This is done by regulating and educating the pesticides industry, applicators, farmers, municipalities and the public.

In 1983-84, 2,380 examinations on pesticides use were held, and licences issued for 8,644 exterminators, 1,277 operators and 3,392 vendors.

The Ministry also issued 1,983 permits for the use of restricted products on land, 412 permits for the application of pesticides to water, and 191 permits for exterminations in structures.

The Ministry approved grants for chemical treatments and structural alterations to control termites for 281 householders in 14 municipalities.

The total amount of these grants in 1983-84 was \$313,268.

A further \$686,932 was given directly to 19 municipalities under new agreements to provide grants at the municipal level.

These one-time grants are intended to reduce the existing backlog of applications by individual home-owners.

Two major projects relating to biological agents were also begun in 1983-84.

The projects were a three-year study to monitor loading of the herbicide atrazine on a small agricultural watershed, and a study to determine the extent and impact of the insecticide aldicarb on groundwater in potato-growing areas of Ontario.

Environmental assessments

Ontario's Environmental Assessment Act promotes environmental safety in the planning and development of a broad spectrum of activities ranging from waste management to municipal transit and roads.

The Act itself is gaining recognition well beyond the borders of Ontario. Representatives of the Italian, Norwegian and Polish governments have visited the Ministry to study its provisions.

The visitors learned that when an environmental assessment is formally submitted to the Minister, Environmental Assessment Branch staff co-ordinate a governmental review of the proposed undertaking.

Staff members consult with proponents, government reviewers and members of the public, advising them on the requirements of the Act.

In 1983-84, staff worked closely with waste management personnel in co-ordinating environmental assessment (EA) requirements for the Blueprint for Waste Management and area waste master plans.

During the year six EAs relating to waste management were submitted and four approved.

Staff were involved in consultation on 29 other waste-related projects, with two exemption orders processed.

A hearing was held under the Consolidated Hearings Act on a proposed Victoria Hospital Energy From Waste facility in London, which the Board approved and Cabinet confirmed.

Three EAs on municipal activities were submitted this year, and another approved.

Nineteen exemption orders for municipal activities were processed, and consultations carried out on six other municipal projects.

Three Class Environmental Assessments were carried out on projects involving municipal water and sewage, municipal transit, and municipal roads.

A Class Environmental Assessment requires only a single approval for activities of a similar nature carried out over an extended period of time.

Pending approval of the Class EA for water and sewage activities, a number of small municipal projects were exempted.

Staff also assisted the Ministry of Transportation and Communications and Ontario Hydro with Class EAs relating to provincial roads and electric power facilities, and the Ministry of Natural Resources in developing an EA for forest management.

Laboratory output increased

Increases in productivity have been recorded by the Ministry's Laboratory Services and Applied Research Branch this year.

The increased productivity of various groups within the branch is attributed to improved equipment and computerized data handling.

The major activity of the branch's central laboratory in Toronto and regional labs in London, Kingston, and Thunder Bay is the production of analytical data in support of Ministry programs.

The general increase in productivity this year was achieved despite the fact that more complex analysis, lower limits of detection, and a wider range of tests have combined to increase the time involved in each analysis.

Quality control samples are part of all laboratory testing procedures.

During 1983-84, the branch carried out more than 20 special inter-laboratory comparisons as part of its quality control program.

Table 1 shows this year's test load summary as compared to last year's.

Acid rain loads labs

As in 1982-83, the Acidic Precipitation in Ontario Study (APIOS) was the largest single program requiring the use of laboratory services during 1983-84.

APIOS testing comprised 29 per cent of the laboratory workload and also accounted for its largest increase, 27 per cent, or more than 100,000 tests.

The additional workload was due to increased activity at regional sites devoted to APIOS investigations, lake liming projects, and growing concern about possible forest decline.

TABLE 1
Laboratory Testload Summary (Tests/1000)

	CHEMISTRY		MICROBIOLOGY		TOTAL	
	82/83	83/84	82/83	83/84	82/83	83/84
REGIONAL LABS						
London	187	170	57	54	244	224
Thunder Bay	93	97	32	42	125	138
Kingston	105	99	64	54	169	153
TOTAL	385	366	153	150	538	515
Central Lab						
Inorganic Trace Contaminants	450	533			450	533
Water Quality	786	870			786	870
Pesticides (Scans)	11	18			11	18
Organic Trace Contaminants	107	28			107	28
Microbiology			136	148	136	148
TOTAL	1354	1449	136	148	1490	1597
Total Regional and Central Labs	1739	1815	289	298	2028	2112



A 42 per cent increase in tests related to solid and liquid wastes this year (or 37,000 tests in all) reflects increased Ministry attention to those problems.

As always, the Ministry's regional operations were the branch's largest client, submitting 64 per cent of the total tests.

Tests submitted by the regions were up by 110,000 this year, an overall eight per cent increase from 1982-83 which also represents a 15 per cent increase to the Central Laboratory's total workload.

Almost 95 per cent of the Central Laboratory sample and test load originated this year from six programs and 12 subtasks. They are listed in Table 2.

Intricate instruments implemented

In order to handle the two million tests completed each year, the Ministry's Central Laboratory uses a centralized computer system called the Laboratory Information System (LIS).

This year, work began to implement the transfer of computerized information from laboratory instruments directly into the LIS.

Called Direct Computer Input (DCI) the process is designed to meet the laboratory's commitment to make full use of the LIS by placing information on all tests and programs in the system.

TABLE 2
Workload by Major Program:
Central Laboratory 1983-84

PROGRAM/SUBTASK	# OF TESTS/1000 TOTAL	% TOTAL
Water Management	419	26
Great Lakes	81	5
Inland Water Quality	124	8
Surface/Water Groundwater	214	13
Industrial Assessment	38	2
All	38	2
Solid/Liquid Waste	37	2
All	37	2
Municipal Management	353	23
Wastewater Treatment	124	8
Drinking Water	188	12
Complaints	41	3
Acidic Precipitation in Ontario Study	475	29
Air	82	5
Water	261	16
Terrestrial	132	8
Air Assessment	202	13
All	202	13
	1524	95
	1524	95

Along with the newly-sophisticated information system, a number of equally intricate instruments for analysis have been installed by the branch this year.

The Water Quality Section acquired a new transmission scanning electron microscope with x-ray diffraction that will expand the laboratory's capabilities in the area of particle analysis.

A sequential inductively coupled plasma (icp) spectrometer was purchased which allows an operator to quickly select and confirm an analysis of more than 60 elements.

Also operational this year is an Elan icp-ms, which is essentially a marriage between an icp source and a mass spectrometer which can determine almost any element in the periodic table to parts per billion.

Testing the air for TOX And POX

A number of new methods of analysing atmospheric pollutants were developed this year, including analytical protocols for TOX (Total Organic Halogens) and POX (Purgeable Organic Halogens) in the air we breathe.



Energy dispersive x-ray fluorescence methods are also now operational for the metals analysis of Teflon filters used to measure inhalable and non-inhalable particulate matter.

The first applications of high resolution mass spectrometry were directed to dioxin analysis this year, and progress made in the development of models to predict the impact of airborne pollutants on various chemicals.

A mass spectrometer, incidentally, is used to separate and identify compounds according to their molecular weight, or mass.

Water purification studies

Studies were carried out by laboratory services in a number of fields involving hazardous contaminants during 1983-84.

The studies included a pilot-plant study in Niagara Falls to purify drinking water, a new water treatment method, and a

study of asbestos corrosion in cement pipes.

Other studies this year included development of a protocol for the routine analysis of hazardous contaminants in wastewater, evaluation of prediction methods for hazardous contaminants in municipal sewage, and the removal of hazardous organic contaminants from sludge.

Studies were also carried out to determine the lethal thresholds of pH and aluminum for Ontario fish.

Both field and laboratory experiments were completed which exposed young lake and brook trout to a range of hydrogen and aluminum concentrations.

Troubleshooting

Laboratory services also handle non-routine complaints and emergency samples that are part of special studies.

This year, for example, assistance was given to the Newmarket Medical Officer of

Health in isolating the cause of a case of lead poisoning.

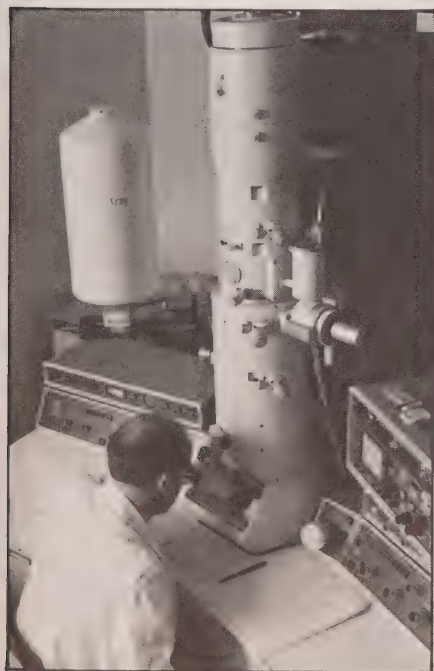
The cause, originally thought to be linked to the general atmosphere, was found to be coming from the house involved.

In addition, the branch provided advice to 11 municipalities on the full-scale adjustment of water plant processes for treatment improvement in 1983-84.

Defining and refining waste management

One of the principal environmental challenges of today's "throw-away society" is the effective management of waste.

In 1982, the Ministry initiated a comprehensive review of the Province's waste management policies and practices which culminated in the issuing of the Blueprint for Waste Management in Ontario, in June 1983.



During 1983-84, the Ministry's Waste Management Branch worked on refining a number of the initiatives suggested by the Blueprint, and by subsequent responses from industry, government and the public to its publication.

Among the initiatives worked on were the development of a comprehensive definition of hazardous waste, the creation of a new waste classification system, new provisions for the regulating of generators of special and controlled waste, and the extension of the current manifest system to include hazardous solid waste.

Ontario currently stores PCBs and PCB-contaminated equipment because there are no PCB waste disposal facilities available in Canada.

PCBs are a family of clear, colorless, oily liquids which are non-flammable and have a high electrical resistance.

They have been extensively used as electrical insulating fluids in capacitors and transformers, as heat transfer fluids, and in the formulation of sealants, caulking, and coatings.

The sole North American producer in the United States ceased production in 1977.

potential proponents of disposal facilities, and other interested parties.

Public information meetings with municipal councils and staff were also held in the 18 communities in Ontario where most in-service PCB and stored wastes are found.

Public hearings on the revised proposals for destruction of PCBs will be held under the Public Inquiries Act.

Radioactive activities

The Ministry takes an active role in monitoring the environment for low-level radioactive contaminants.

During the year Waste Management Branch staff reviewed data on the concentration of radionuclides in Ontario's air and water and provided radiation consulting services to other branches and regions.

Staff also worked closely with the radiation protection laboratory of the Ministry of Labour and maintained close links with federal radiation monitoring agencies.

As well, they joined with personnel from the Atomic Energy Control Board and Environment Canada on an inter-agency committee to review progress on high-level radioactive waste disposal.

Waste money well spent

In 1983-84, the Ministry awarded grants totalling \$500,000 to municipalities for approved work on investigations, improvement, upgrading and closure of landfill sites.

The grants bring the total amount expended on this type of landfill management since 1978 to \$3.2 million.



Protection against PCBs

During the fiscal year, the Ministry embarked on a program to introduce specific regulations for the destruction of all liquid and some solid polychlorinated biphenyls (PCBs) wastes in Ontario.

Portable destruction facilities like those pictured above are among the mobile technologies being considered as replacements for the Province's present fixed-storage installations.

Subsequent regulation in the U.S. and Canada restricted their use to in-service closed systems and prohibited their production, sale, or import.

The Ministry's discussion paper outlining tentative proposals for destruction regulations was published in February, 1983, and in the fall of that year a Task Force was formed to review and carry forward the proposals.

Consultations were held during the year with industry, municipalities, public interest groups,

Additional grants totalling \$435,000 were given to four companies and four organizations which serve 17 Ontario communities in the separation of wastes that can be recycled.

The source separation program has to date given grants of almost \$1 million to establish and promote operations which now serve 15 municipalities and one million residents.

Many of the operations reported a 70 per cent participation by residents and indicated that more than 10 per cent of household wastes that otherwise would have gone to a landfill were diverted.

More than 17,000 tonnes of material, worth more than \$1 million, were recycled during the year.

In addition, the Ministry contributed \$250,000 this year towards the development of waste management master plans by regional municipalities, counties, districts and groups of municipalities.

The Ministry has been supporting this type of municipal planning since 1972, and provides both technical guidance and 50 per cent funding of waste planning study costs.

Turning trash into cash

A Waste Management Branch recycling project recovered more than 200 tonnes of paper from government offices and generated a revenue of \$10,000 this year.

It was the fifth successive year for the recycling project, which involved about 14,000 employees in 50 Toronto-area buildings.

A Ministry-funded experiment on the use of fuel derived from refuse, which was conducted at the Brampton Brick Company this year, proved less conclusive.

Although the results of a similar study last year were promising, definite conclusions could not be drawn from this year's efforts and further tests will have to be made before the refuse-based fuel can turn a profit.

However, process changes proposed this year by the branch to improve the quality of compost used in parks, conservation areas and horticulture, are expected to improve its retail marketability.

Disposal site inventories

A comprehensive inventory of active waste disposal sites in Ontario was completed by the Waste Management Branch this year.

The computerized inventory provides data on existing disposal facilities which can be used as information for provincial and municipal land use planning and the establishment of new disposal sites.

The branch is also developing a computerized inventory of disposal sites closed prior to the passing of waste management legislation in 1970.



The branch also reports that good prices have been paid for magnetically separated ferrous (iron-containing) material which is used in food and beverage cans.

The cans contain 70 per cent of ferrous material.

The purpose of the study is to identify old sites which may pose a potential threat to the environment.

Remedial action has already been taken at sites where environmental problems have been identified.



About 200 out of 1,451 closed or abandoned municipal waste sites were studied by a consultant hired by the Ministry to determine the extent of potential environmental problems.

In cases where it was concluded that more work was required, municipalities are carrying out additional investigations.

Municipal guidelines

In 1982-83, the Ministry implemented guidelines on the beneficial use of sewage sludge on agricultural lands.

This year the guidelines were revised to reflect the latest technical knowledge on the subject.

The guidelines were revised by the branch with assistance from the Ontario Ministry of Agriculture and Food, the Ontario Federation of Agriculture, the Municipal Engineers' Association, and soil scientists from the University of Guelph.

A study completed last year on generation rates and migration patterns of landfill-generated gas was used this year to create guidelines on the development of land on and adjacent to waste disposal sites.

A survey of hospitals and institutions generating pathological waste was begun this year, and methods of handling and disposing of the wastes were studied.

As a result, Ministry guidelines are being revised to include the sterilization of infectious wastes by pressure and heat processes.

Looking beyond Ontario's borders

In 1983-84, a new Technology Assessment Section was added to the Waste Management Branch to monitor advances in waste research and technology created outside of Ontario.

The section is responsible for identifying and assessing new innovations in the areas of waste processing, destruction technology, landfill disposal, and waste site evaluation.

The section then determines the applicability of such new developments to Ontario conditions and informs the public about their potential for the Province.

The section also plays a leading role in investigating waste sites where environmental problems have been identified.

This year the new section provided support to investigations of problem waste sites, analysed priority sites in the branch's inventory, and looked into the design of landfill liners and covers, leachate treatment, and the destruction of polychlorinated biphenyls (PCBs).

Intergovernmental Relations and Strategic Projects Division

1983-84 Intergovernmental relations and strategic projects highlights

- New international air pollution agreements signed.
- Ontario given right to intervene in U.S. court case.
- Mathematical models for analysing air pollution improved.
- New endangered lakes identified in Ontario.
- Northern lakes bombed back to life.
- First fully automated acidic precipitation facility in North America opened.
- Acid rain-related death of maple trees probed.
- Canadian sulphur dioxide abatement measures fixed by federal government and seven provinces.



Agreements negotiated and revised

Co-operation between governments is essential to the protection of the environment. An important factor in developing that co-operation is the signing of joint agreements to fight pollution.

The Intergovernmental Relations Office, responsible for co-ordinating the Ministry's efforts to resolve environmental problems with other jurisdictions, has negotiated and revised a number of important national and international agreements during the fiscal year.



Canada, for example, does not have a full bilateral agreement on air pollution control with the United States government.

The Ministry, however, began negotiations on Memoranda of Understanding on transboundary air pollution control with the state of Michigan.

The accord with Michigan will replace an earlier arrangement between the state and Province affecting sources of air pollution in the southeastern Ontario-southeastern Michigan area.

During the year, Memoranda of Understanding to combat acid rain were also signed with the states of Minnesota and New York.

In this country, negotiations were begun for revision of the Canada-Ontario Accord for the Protection and Enhancement of Environmental Quality. Discussions held with the Province of Quebec led to the development of a draft environmental accord.

Great Lakes agreement

New measures for the control of toxic substances and pollution from agriculture in the Great Lakes area have been developed as a result of Ontario's participation in a joint agreement with the United States government.

The development of the control programs for nonpoint pollution from agriculture was begun in response to the Province's participation in the 1983 Phosphorus Control Supplement to the Canada-United States Agreement on Great Lakes Water Quality.

The controls were developed by the Ministry in accordance with our own Canada-Ontario Agreement on Great Lakes Water Quality, which reflects the Canada-U.S. agreement and provides the framework for Canadian pollution control in the Great Lakes Drainage Area.

This important and wide-ranging agreement between the Province and Ottawa also serves as the vehicle for federal provincial financing of sewage construction, phosphorus control, and all surveillance activities in the Great Lakes area.

International co-operation

International, as well as national meetings on the problems of pollution play a prominent part in the work of the Intergovernmental Relations Office.

During the past year, the office participated in an advisory capacity with the International Joint Commission's Water Quality Board and represented Ontario at Commission Meetings in Washington, Indianapolis and Ottawa.

Niagara River cleanup

Cleanup recommendations for several chemical waste sites in New York State have been made to American authorities as a result of hydrogeological evaluations made on the sites this year by the Ministry's Niagara River Improvement Team (NRIT).

The NRIT co-ordinates Ontario's efforts to reduce the discharge of contaminants into the river from both Canadian and United States sources. Since about 90 per cent of the contamination comes from the U.S. side of the river, the team is in continuous contact with state and federal agencies to press for corrective action.

The evaluations include assessments made of Occidental Chemical's Niagara plant site, and the 102nd street sites.

Ontario intervenes

A U.S. Federal Court judge has ruled that Ontario has the right to intervene in a court case involving Occidental Chemical's contaminated S-Area site.

The February, 1984, ruling stems from a request originally made by the Ministry in June, 1983. It gives the Province the right to formally challenge proposed cleanup plans for the site, which the Niagara River Improvement Team argues are inadequate.

The NRIT also reviews and challenges applications for new landfill sites. In June, 1983, the team approached the New York State Department of Environmental Conservation in connection with an application by SCA Chemical Services Incorporated to expand its hazardous waste landfill capacity at Model City, near Lewiston, N.Y.

Negotiations resulted in the company's agreeing to a significantly more extensive subsurface monitoring program for the site than had been originally proposed.

The monitoring will now continue both during and after the active life of the Model City landfill site.

U.S. permits challenged

Throughout the year, the NRIT continued its analysis of permits issued by New York State for industrial and municipal discharges.

Comments and suggestions for changes were regularly submitted to the state's Department of Environmental Conservation.

In the case of a permit for the Niagara Falls Wastewater Treatment Plant, however, Ontario is prepared to go even further. The permit is being challenged by a group of local industries as being too strict.

The Province, on the other hand, is seeking to take part in the state court proceedings to argue that no lessening of the permit's requirements should be allowed.

In addition, the team played a major role in the work of the international Niagara River Toxics Committee in preparing its report on contaminant loadings into the river.

Indexing pollution

During 1983-84, Ontario's acid rain program, the Acidic Precipitation in Ontario Study (APIOS) made major improvements to two mathematical models for analysing the long-range transport of atmospheric pollutants.

The models, developed by the Ministry to calculate how much of the acid rain falling in any particular place comes from any given source, are also being adopted by U.S. environmental agencies.

Under a co-operative agreement signed this year with the State of Minnesota, copies of both these atmospheric models were transferred to the Minnesota Air Pollution Control Commission.

An agreement with the State of New York resulted in a similar transfer to that state's Department of Environmental Conservation.

Work also continued this year in developing a comprehensive sulphur dioxide and oxides of nitrogen emissions inventory for eastern North America. This information is essential in planning cutbacks of acid gas emissions.

Acidified lakes

An extensive APIOS survey of lakes in Ontario identified a number of acidified lakes in the Province during 1983-84.

The survey, carried out in co-operation with the Ministry of Natural Resources, is designed to identify the number of lakes in Ontario that are at risk due to acid rain.

A sampling of more than 4,000 lakes in the Province for their sensitivity to acidic deposition has revealed that the majority of the acidified lakes are within 50 to 100 kilometers of Sudbury.

However, a number of acidified lakes were identified in other areas of the Province, including Algonquin Park, Muskoka-Haliburton, Algoma and Parry Sound.

Bombing lakes back to life

When a twin-engined Canso aircraft skims over a northern lake and drops a load of limestone that hits the water like a bomb, the fight against pollution begins to look like all-out warfare.

Actually, this kind of lake neutralization by liming is a measure to delay or reduce the effects of acidification.

Faced with the fact that abatement programs may take anywhere from five to 15 years to solve the problems of acid rain, the Ministry is exploring such interim measures of protecting or rehabilitating a limited number of lakes.

During 1983-84, Bowland Lake, an acid lake 70 kilometers north of Sudbury, was neutralized and the pH was raised from about 5.1 to approximately 6.8. After the operation the lake was stocked with yearling and adult Lake Trout.

Monitoring of Bowland Lake will continue.

In 1984, Trout Lake near Parry Sound was limed with 150 tonnes of finely powdered limestone. The lake still has Lake Trout, but acidic deposition was causing a stress on the population.

The experiment is designed to evaluate the effectiveness of liming as a protective measure.

It's raining inside!

In August, 1984, Environment Minister Andy Brandt officially opened a \$400,000 mobile rain exclusion canopy system that will explore the effects of acid rain on Ontario's field crops.

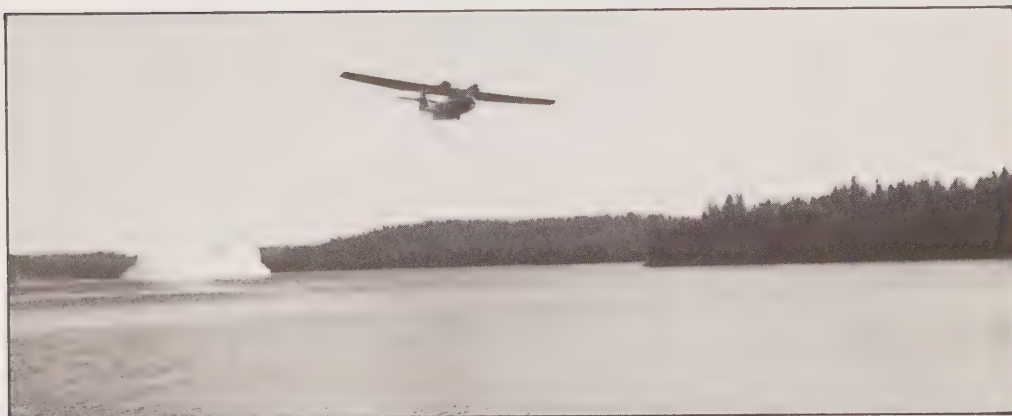
The system, located at the Ministry's phytotoxicology laboratory in Brampton, is the first fully automated acidic precipitation facility in North America and is part of the Acidic Precipitation in Ontario Study (APIOS).

The innovative new system features three large mobile canopies, 64 feet by 30 feet, each set on tracks 150 feet long.

Every time it rains the canopies roll into place to cover test crops from natural rainfall. Under the canopy, acid rain with different concentrations can be applied.

In this way, the test crops are exposed to identical growing conditions, with only the chemistry of the rain subject to variation. This system, which will be fully operational in 1984-85, permits researchers to make more accurate assessments of the effects of acid rain on important agricultural species, including soybeans and corn.

The system, which combines the best features of systems currently operating in the United States, also has a blow air component that protects the crops from dust particles and other forms of airborne pollution gases when they are not covered by the canopies.



Saving the trees

In the spring of 1984, a sizeable number of maple syrup producers throughout southern Ontario became concerned about the increasing number of maple trees that were declining, deteriorating and ultimately dying in their woodlots.

They complained to the Province and a team of scientists and specialists involved in the Ministry's acid rain research program (APIOS) was formed to investigate the causes of what became known as the Maple Dieback Syndrome.

Maple dieback is a complicated, puzzling problem that's been around since 1952, when it was first reported in Ontario.

It's complicated by the fact that the sugar maple is a unique species that doesn't adapt easily to modern times and is susceptible to a number of stresses because of its shallow root system.

Factors such as roots covered by pavement, excavations, winter salt splashed on roadside trees and salt runoff along roads can result in branch dieback due to stress.

Root rot occurs on stressed trees and branch dieback progresses down the tree, ultimately killing it.

The role acid rain plays in the killing of maple trees will be determined by the continuing Ministry study, through analysis of woodlot samples and a thorough historical overview of the plots tested.

Results of the maple dieback study are expected to become available in 1985.

International research

Acid rain is an international problem, and Ontario is also involved in acid rain research on an international level.

During 1983-84 Canada and the United States established a special committee to exchange scientific information and to set up joint research projects.

In addition, Ontario's APIOS researchers are involved in a number of joint projects with several European nations.

Ontario was also represented at the Canada-Europe Ministers Conference in Ottawa on March 20-21, 1984, at which nine European nations declared their intentions of reducing sulphur dioxide emissions by 30 per cent by 1993.

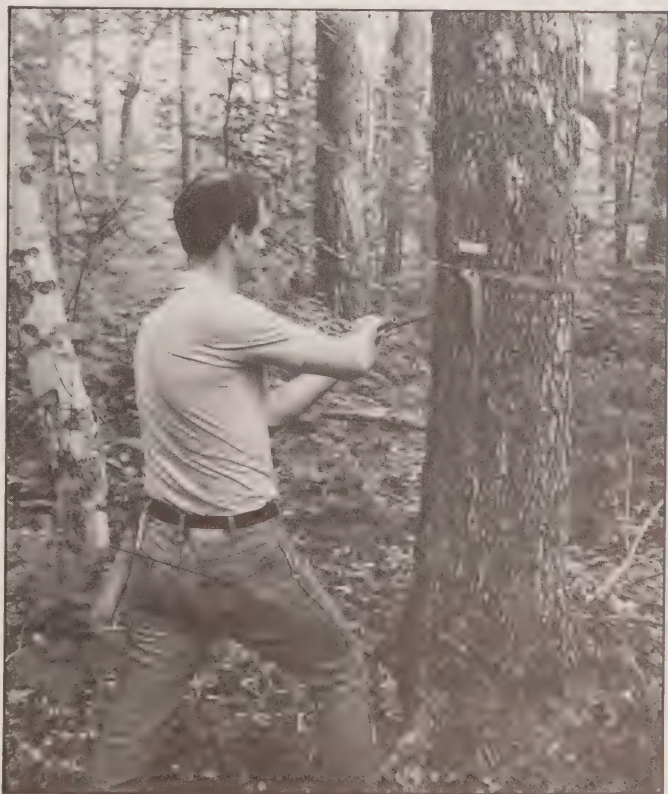
Who'll stop the rain?

Since it's been reliably estimated that anywhere from 50 to 70 per cent of acid rain fallout on Ontario comes from sources in the United States, it is essential that the U.S. match Canadian efforts at abatement.

On March 6, 1984, federal and eastern provincial ministers of the environment took a major step in implementing our abatement measures by agreeing on a sulphur dioxide emissions cap of 2.3 million tonnes to be imposed by 1994.

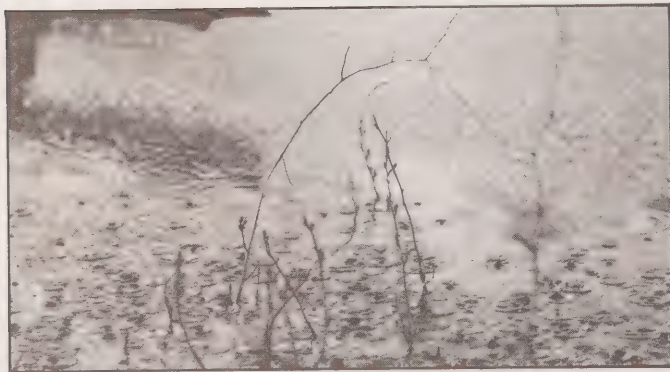
This represents a reduction of 50 per cent from 1980 levels.

The overall Canadian target is to reduce deposition in sensitive areas of eastern Canada to 20 kilograms of sulphate per



hectare (or 18 pounds per acre per year) which is believed sufficient to protect most surface waters sensitive to acid rain.

Precise allocations of the reductions necessary to achieve this emissions cap are currently being developed by the federal government and the seven eastern provinces involved in the agreement.



The position of the U.S. Government, however, is that more research is needed to establish the cause-and-effect relationship of acid rain before taking action to match the Canadian abatement effort.

Thus throughout the year, Ministry personnel made a special effort to inform the U.S. of the extent of the problem in Ontario, and to convince Americans that their co-operation is vital to the realization of the Canadian abatement target.

As a result, Ontario continued to express its concern to the U.S. Environmental Protection Agency and to individual state agencies when relaxation of State Implementation Plans for control of sulphur dioxide emissions were being considered.

Showings of acid rain films were arranged at Canadian consulates and on public television, and Ministry personnel participated in U.S. acid rain seminars and Congressional hearings.

A tour of the Dorset field site, located in one of the Province's most sensitive areas, was arranged for the U.S. National Acid Precipitation Assessment Plan Task Force.

They visited the site as part of their annual meeting with the Canadian Federal-Provincial Long Range Transport of Atmospheric Pollutants Research and Monitoring Committee.

Acid rain report

As part of its efforts to increase public awareness of the acid rain problem during 1983-84, the Ministry released a weekly acid rain report to the news media every Tuesday.

The information is collected from monitoring stations such as the one pictured at right.

Prepared jointly with Environment Canada, the report summarizes the pH of rain and snow over the preceeding seven days at various areas in eastern Canada, including Ontario's Dorset site.

Improving waste management

Ontario's Blueprint for Waste Management was released in June, 1983, at the 30th annual Ontario Industrial Waste Conference in Toronto.

The 75-page Blueprint and its 11 appendices presented a comprehensive series of Ministry proposals, including proposed controls and regulation to cover the full spectrum of waste management from generation through recycling to



post-disposal environmental security.

The report was distributed to a large number of groups, organizations and individuals with interests and responsibilities in waste management.

During the summer of 1983, the Ministry conducted an extensive series of public information meetings to explain the Blueprint proposals in greater detail.

Fifty presentations were made to municipalities, public interest groups, industry associations and government agencies; 16 public information "open houses" were held for the general public, and three workshops were held with special groups.

During September and October of 1983, the Ministry held public forums at 20 locations around Ontario to provide the

public with an opportunity to present written or oral submissions in response to the Blueprint.

All submissions are being carefully analysed and will be used in updating and refining the original proposals.

Preparing for emergencies

"Pouring oil on the waters," may be a euphemism for solving trouble to most people, but to the Ministry's Emergency Response Co-ordination Office it means that trouble has just begun.

The office, which received 607 reports of spill incidents from across the Province in 1983-84, maintains and updates the Province of Ontario Contingency Plan for Spills of Oil and Other Hazardous Materials.

The reports are summarized to obtain statistics on the causes, extent, and nature of the spills, and the data used in the development of policy and regulations to protect the environment.

In the past year the office assisted in providing an up-to-date field communications system and in the assessment of equipment and techniques used in field operations.

The office also co-ordinated the Ministry's participation in simulated exercises to prepare workers for the real thing.

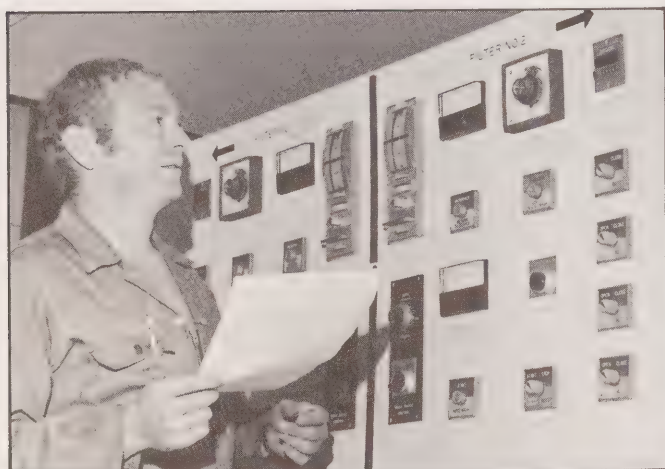
During 1983-84, personnel joined with Transport Canada on marine spill exercises, representatives from municipalities and industry on various other types of spill exercises, and with the Ministry of the Solicitor General on a nuclear exercise.



Finance and Administration Division

1983-84 Finance and administration highlights:

- Ministry spends \$63.9 million on operation of sewage and water treatment plants.
- Ontario's net investment in sewage and water treatment facilities now \$1.1 billion.
- New billing system for municipal water and sewage rates implemented.
- Comprehensive auditing procedures initiated.
- Information systems improved.



\$63.9 Million in Sewage and Water Works

Far from pouring money down the drain, the Ministry spent \$63.9 million this year to operate Ontario's sewage and water works systems.

Operated under agreements with municipalities and industrial concerns, these systems generated total revenues from investment and operation of \$118.5 million during the same period.

As of March 31, 1984, Ontario's net investment in this high priority area of environmental health stands at \$1.1 billion, and represents some 800 agreements with municipalities across the Province.

New billing system

For Ontario municipalities, the heavy consumer impact of the old five-year billing cycle for sewage and water rates is now a thing of the past.

New amendments to the Ontario Water Resources Act now allow the Ministry to conduct the service rate reviews annually, rather than once every five years.

The legislative amendments passed this year also allow the Capital Financing and Revenue Branch to implement a new system to bill municipalities on equal monthly charges instead of service charges based on the volume of water and sewage treated.

This streamlining of the billing process will significantly improve budgeting and cash flow planning of both the Province and its client municipalities.

Audit update

More help for Ministry managers is on the way as a result of a new training program developed this year by the Management Audit Branch.

The program was designed to enable staff to make use of the latest methods in undertaking "value for money" audits of the Ministry's operations.

Unlike purely financial systems of auditing, "value for money" auditing techniques evaluate both financial controls and management procedures.

Thus Audit Branch staff are now in a position to play an expanded role as advisers to management personnel on factors which govern not only the economy, but the overall efficiency and effectiveness of their departments.

New systems developed

As new data and techniques become available, the Ministry's computerized information systems are constantly being developed and improved.

The Office of Systems Development, for example, undertook the following major projects during 1983-84:

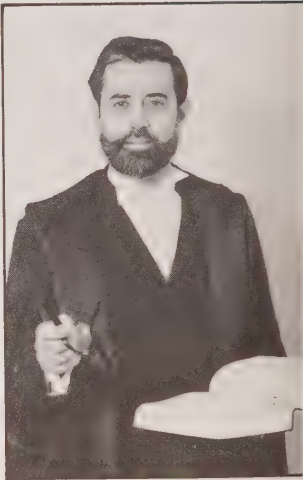
- A feasibility study to develop a new Air Quality Telemetry System.
- Modifications to the Sample Information System.
- Modifications to the Waste Site Information System.
- Further development of the Industrial Waste Waybill System.
- Expansion of the processing facilities for the Laboratory Information System.
- A feasibility study to assess the need for new computer facilities in the Northwestern Region.
- Implementation of the Industrial Monitoring Information System.



Deputy Minister's Office

1983-84 Deputy minister's office highlights:

- \$2.4 million spent on external scientific research.
- Management-By-Results system improved.
- New environmental options and policies studied.
- Fines levied against polluters.
- Opportunities for women increased.
- French language services expanded.
- Environmental packaging prizes awarded.
- Women volunteers provide Ministry eye-in-the-sky.

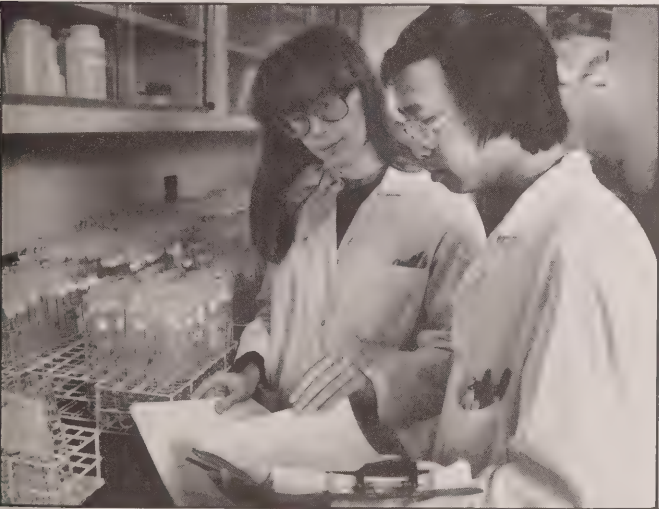


\$2.4 Million spent on external research

Scientific research, and the resources to carry out that research, provide the intelligence lifeline in the Ministry's battle to protect the environment.

In 1983-84, for example, the Ministry's Policy and Planning Branch co-ordinated the management of 67 non-Ministry research projects costing \$2.4 million.

In addition, a new research planning process was implemented and a research plan developed for air pollution and water, liquid and solid waste research.



Program evaluations

The Policy and Planning Branch implemented eight of 13 new management standards and carried out program evaluations of the Water Resources and Laboratory Services and Applied Research branches in 1983-84.

The evaluations were part of this year's reorganization of the Environmental Planning Division.

New environmental options

In 1983-84 the Policy and Planning Branch made a number of social and economic studies of proposed environmental policy options in waste management, environmental standards and pollution control.

The branch also assisted in the study of acid rain and approaches to its control in Ontario.

Jumping on dumpers

Staff of the Ministry's Legal Services Branch handled 75 prosecutions which were initiated during the fiscal year.

The highest fines imposed as a result of these prosecutions totalled \$3,057,000 and were levied against a disposal company and one individual operator.

The branch prepared extensive amendments to the Environmental Protection Act and the Water Resources Act which were enacted by the Legislature, and took part in interventions and legal procedures in the United States concerning transboundary pollution in the Niagara River.

Staff also acted as counsel for the Ministry in several major environmental hearings held this year.

Opportunities for women expanded

The Ministry's Affirmative Action Office reports that two women have been made branch directors and a woman has been hired as a chief operator in the plant operations area.



The office also explained that the largest amount of staffing dollars spent during the year was expended on training women in technical and professional courses.

In addition, the manager of the program upgraded her professional experience by taking part in a three-month secondment to the Ontario Women's Directorate.

Regular program activities were carried on with the Women's Advisory Committee, and the office published two newsletters detailing opportunities for women during the fiscal year.

French language services

Bilingual capability has now been developed in 13 of the Ministry's 23 branches and in 11 of its 13 district offices.

An extensive campaign aimed at Franco-Ontarians was conducted this year to promote programs and services in French.

The Ministry also increased the number of bilingual forms available to the public from 28 in 1982-83 to 59 in 1983-84.

As well, the Environmental Explorations Program was conducted bilingually this year, promoting environmental studies in French in 54 locations across Ontario.

Educational material on the environment, as well as many of the Ministry's non-technical publications and about 75 per

cent of its fact sheets, can now also be obtained in French.

Show and tell

During the year displays on acid rain and pesticides were staged by the Communications Branch at more than a dozen major fairs and events throughout Ontario.

Included in the displays were presentations at the Canadian National Exhibition, the International Plowing Match, the Sault Ste. Marie Sportsman's Show and at the Agricultural Safety Association's gathering in Ottawa.

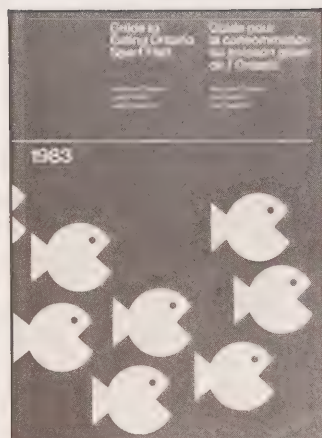
Open houses and tours, some especially arranged for legislators, scientific task forces and news media from the United States, were staged at the Ministry's Acid Rain Research Centre at Dorset.

The branch answered more than 15,000 public enquiries by telephone and mail and arranged special seminars, hearings and meetings as part of the Ministry's public participation program in areas such as the Blueprint for Waste Management.

Fish story

The sixth annual edition of the bilingual Guide to Eating Ontario Sport Fish was published and 150,000 copies distributed free during 1983-84.

Designed to provide the angler and consumer with information on elements such as mercury, polychlorinated biphenyl (PCBs) or other trace contaminants in sport fish, the guide contains data on more than 75,000 fish collected from 1,200 rivers, lakes, and areas of the Great Lakes.



Popular publications

Cottage Country, a popular bilingual environmental manual for the cottager was updated, reprinted and distributed in co-operation with the Federation of Ontario Cottagers' Associations.

The manual is designed as a guide to the protection and preservation of Ontario's vacationlands.

The Communications Branch also produced an award-winning tabloid which was inserted in local newspapers. The tabloid explained, in layman's language, a hydrogeological report on a landfill site in Tiny Township.

Pitching in to clean up

Again this year the Communications Branch assisted the Ontario Federation of Anglers and Hunters in staging its annual Pitch-In campaign to clean up litter.

Members of more than 1,800 groups, almost a 50 per cent increase over last year's turnout, scoured rivers, streams, shorelines, trails and back roads all over Ontario.

They cleaned up and cleared away hundreds of tonnes of litter and junk in the process.

The 552 delegates who attended this year's 31st Industrial Waste Conference, which was co-ordinated by the

branch, made a different, but no less significant contribution to cleaning up the environment.

Prize packages

Five students of industrial design from Humber and St. Lawrence colleges were awarded prizes at this year's All-Ontario Environmental Packaging Competition.

Jointly sponsored by the Communications Branch, the Packaging Association of Canada and the Ministry's Waste Management Branch, the contest seeks to encourage young designers to think of tomorrow in environmental terms.

The reduction of material and energy waste from packaging and garbage disposal is a prime consideration of the judges.

The five students won their prizes for the design of environmentally sound packaging of personal hygiene products.



Students sent back to school

Eight university students employed by the Communications Branch were sent back to school last year.

In fact, the students were sent to 413 schools, resident camps and provincial parks across Ontario, where they lectured and provided information on environmental programs to other students and adults.

The eight summer students were part of the Ministry's 16-week Environmental Explorations Program, which is designed to promote interest and concern for the environment.



More than 100,000 people attended the summer sessions in 1983-84.

High flying femmes

For the sixth year a group of adventurous women pilots has flown volunteer surveillance and photographic patrols over Ontario's major waterways.

The pilots are members of the Ninety-Nines Inc., an international organization of female flyers who assist the Ministry in its Operation Skywatch.

aviation. Their first president was famous flyer Amelia Earhart.

About 75 Canadian women are now involved in the eye-in-the-sky operation, in which airborne investigators from the Ministry's regions detect and photograph pollution sources.

Shorelines are monitored for oil spills, aquatic vegetation patterns, sediment from rivers and other sources of pollution such as erosion areas, waste discharges and landfill sites.



The group's name, incidentally comes from the original number of members who banded together in 1929 to broaden opportunities for women in

In 1983-84, the Skywatch aircraft was modified for limited vertical photography, which has improved the operation's surveillance potential.



Adding up the interest

An idea of just how topical the subject of the environment is becoming can be gained from some statistics provided by the Ministry's Library Services Section.

During 1983-84, 2,311 members of the public used the section's public reading room and the library circulated 13,747 books and loaned 7,489 journals relevant to the environment.

Associated agencies, boards and committees

There are a number of agencies, boards and committees associated with the Ministry of the Environment.

The relationship between some of these groups and the Ministry is that of an independent tribunal which reports to the Legislature through the Minister.

Environmental Assessment Board

The Environmental Assessment Board conducts public hearings on environmental issues under the following legislation (the number of hearings which took place during fiscal 1983-84 being indicated after each act in parenthesis):

- The Ontario Water Resources Act (8)
- The Environmental Protection Act (12)
- The Environmental Assessment Act (0)
- The Consolidated Hearings Act (7)

In July, 1983, the board developed a brochure entitled a Guide for Hearings intended to assist all members of the public who wish to take part in its hearings.

During the fiscal year the board also initiated experimental mediation procedures involving a proposal in the North Simcoe area.

Operating expenses of the board for the fiscal year amounted to approximately \$811,808.

Environmental Appeal Board

The Environmental Appeal Board provides an appeal mechanism for persons affected by certain decisions made by the Ministry or by local health units.

In 1983-84 the board received 25 appeals. Approximately 56 per cent of these appeals concerned decisions of local health units on private sewage systems.

The remaining appeals resulted from Ministry decisions regarding waste disposal sites, waste management systems, waterworks and air pollution control.

The board held 19 days of hearings. It resolved 19 of the appeals received during the year and 12 appeals from the previous year. One appeal from



the previous year remained in abeyance.

At year-end, decisions remained to be issued, or hearings held, on six appeals.

Environmental Assessment Advisory Committee

The Ontario Environmental Assessment Advisory Committee, established in 1983, carries out three different kinds of review:

Category A, an open review, provides for public notice and consultation at the discretion of the committee.

Category B, a defined review, provides for public notice and consultation with directly affected groups to be selected either by ministerial direction or by the committee itself.

Category C, an internal review, does not provide for public notice. The Minister informs the committee that he has made a preliminary determination on the request, and the committee's advice is then given.

Members must report on Category A referrals within six weeks, on Category B referrals within four weeks, and on Category C referrals within one or two weeks.

At the end of the fiscal year the committee had reported to the Minister on five Category B referrals and five Category C referrals.

Ontario Scientific Advisory Committee on Dioxins and Furans (OSAC)

This new five-member committee advises on the setting of standards for the presence of dioxins, dibenzofurans, and other related substances in drinking water and air emissions.

During the fiscal year the committee held consultation meetings with Ministry staff and personnel of the Air Resources Branch, Environment Canada, the U.S. Environmental Protection Agency and Dow Chemical Canada.

Committee members also reviewed and revised a number of important scientific documents and reports during the year.

Pesticides Advisory Committee

The Pesticides Advisory Committee annually reviews the Pesticides Act, its regulations, and government publications concerning pests and pesticides.

The committee also enquires into matters directly related to pesticides and the control of pests.

In 1983-84, the committee recommended changes to Ontario Regulation 751 and evaluated the environmental impact, toxicity, and hazard of four new active pesticide ingredients.

One-hundred-and-sixty-seven newly registered products, including 11 fertilizers containing pesticides, were evaluated, and a scheduled classification for storage, sale and use was recommended for each.

A review resulted in the reclassification of 15 products and the removal of 11 from the active list of scheduled products, and overall guidelines for pesticide products were reviewed and updated.

During the year the committee continued its scientific research program to find safe pesticides, determine the hazards of those already in use, and reduce pesticide influence on the environment.

The Committee reviewed 47 research proposals of which 2 were funded by the Ministry at a cost of \$300,300.

A symposium was held in January, 1984, at which grant recipients reported on their findings in preparation for the committee's annual research report.

Farm Pollution Advisory Committee

Consisting of four prominent farmers, this committee provides objective assessment of farm environmental situations as requested by Ministry officials.

The committee visits farms to investigate complaints and make recommendations concerning manure storage and spreading, cultivation, yard drainage, and ventilation of livestock and poultry buildings.

In 1983-84, the committee investigated complaints about beef feedlots and poultry farms.

Ontario Waste Management Corporation

The Ontario Waste Management Corporation (OWMC), is responsible for the construction and operation of a Province-wide system for the treatment and disposal of liquid industrial and hazardous waste.

The corporation is also responsible for developing a long-term program to assist in the reduction and recycling of such wastes in Ontario.

By the end of fiscal 1983-84, three phases of a five-phase facilities development process were completed and reports on each phase issued.

The process is designed to prepare detailed proposals on appropriate technologies and sites for industrial waste disposal systems.

The agency's activities during the year also included the hiring of an engineering firm as consultants to the project and market surveys of 1,000 Ontario industries.

The surveys were to determine the type and quantity of industrial and hazardous wastes that require special treatment.

Industrial Waste Management Hearing Panel

The Hearing Panel on Industrial Waste Management was established to investigate, hold hearings, and report on the Ontario Waste Management Corporation's proposal to locate and build waste management facilities.

Their public hearings and report deal with each proposed facility, whether sites are safe and technologically sound, and whether the facility is to be constructed in an environmentally sound manner.

The five-member panel, an independent body, reports to the Lieutenant-Governor-in-Council.





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